

09/936,148

=> FILE REG

FILE 'REGISTRY' ENTERED ON 24 APR 2007

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=> DISPLAY HISTORY FULL L1-

FILE 'HCA'

L1 480531 SEA ELECTROLY?  
L2 65619 SEA FUEL?(2A) (CELL OR CELLS)  
L3 800159 SEA MEMBRAN?  
L4 1257 SEA NONSWELL? OR NON(2A)SWELL?  
L5 130854 SEA GRAFT?  
L6 71328 SEA (PROTON? OR H) (2A) (COND# OR CONDUCT? OR TRANSPORT?  
OR MIGRAT? OR TRANSFER? OR MOVE# OR MOVING# OR MOVEMENT?)  
L7 455162 SEA PORO? OR MICROPORO? OR NANOPORO? OR PORE# OR  
MICROPORE# OR NANOPORE#  
L8 97293 SEA L7(2A) (SUBSTRAT? OR SURFACE? OR BASE# OR SUBSTRUCT?  
OR UNDERSTRUCT? OR UNDERLAY? OR FOUNDATION? OR MATERIAL#)  
L9 133 SEA (L1 OR L2) AND L3 AND L5 AND L6  
L10 19 SEA L9 AND L7  
L11 8 SEA L9 AND L8  
L12 1 SEA L9 AND L4  
L13 52 SEA L4 AND (L1 OR L2)  
L14 13 SEA L13 AND L3  
L15 1 SEA L13 AND L5  
L16 4 SEA L13 AND L6  
L17 17 SEA L13 AND L7

FILE 'LCA'

L18 14811 SEA (INHIBIT? OR HINDER? OR IMPED? OR ARREST? OR REDUC?  
OR REDN# OR RESIST? OR SUPPRESS? OR RETARD? OR PROHIBIT?  
OR PREVENT? OR BLOCK? OR ELIMINAT?)/BI,AB  
L19 2101 SEA (INFUS? OR SUFFUS? OR DIFFUS? OR TRANSFUS? OR  
EFFUS?)/BI,AB

FILE 'HCA'

L20 685 SEA (L18 OR LOW OR LOWER? OR DIMINISH? OR LESS? OR  
DECREAS? OR CURTAIL?) (3A) (METHANOL# OR (ME OR METHYL# OR  
WOOD#) (A) (ALC# OR ALCOHOL##) OR MEOH OR CH3OH) (3A) (L19  
OR PERMEA? OR INFILTRAT? OR PENETRAT? OR ABSORB? OR  
ABSORP? OR ADSORB? OR ADSORP? OR SORB? OR CHEMISORP? OR  
CHEMISORB?)  
L21 325 SEA L20 AND (L1 OR L2)

L22	272	SEA L21 AND L3
L23	1	SEA L21 AND L4
L24	23	SEA L21 AND L5
L25	179	SEA L21 AND L6
L26	48	SEA L21 AND L7
L27	23	SEA L21 AND L8
L28	10	SEA L21 AND L9
L29	10	SEA L24 AND L25
L30	4	SEA L24 AND L26
L31	3	SEA L24 AND L27
L32	33	SEA L25 AND L26
L33	19	SEA L25 AND L27
L34	23	SEA L26 AND L27
L35	19	SEA L32 AND L34
L36	1028	SEA L5(3A)L7
L37	41	SEA L36 AND (L1 OR L2)
L38	23	SEA L37 AND L3
L39	1	SEA L37 AND L4
L40	5	SEA L37 AND L6
L41	17	SEA L37 AND L8
L42	2	SEA L37 AND L20
L43	0	SEA L28 AND L41
L44	71820	SEA GRAFT?(3A) (POLYM? OR HOMOPOLYM? OR COPOLYM? OR TERPOLYM? OR RESIN?)
L45	444	SEA L44(3A)L7
L46	20	SEA L45 AND (L1 OR L2)
L47	13	SEA L46 AND L3
L48	1	SEA L46 AND L4
L49	1	SEA L46 AND L6
L50	10	SEA L46 AND L8
L51	1	SEA L46 AND L20
L52	4	SEA L47 AND L50
L53	18	SEA L11 OR L15 OR L16 OR L23 OR L30 OR L31 OR L39 OR L40 OR L42 OR L48 OR L49 OR L51 OR L52 OR L12
L54	69	SEA (L10 OR L14 OR L17 OR L28 OR L29 OR L33 OR L41 OR L47 OR L50) NOT L53
L55	21	SEA (L24 OR L27 OR L34 OR L38) NOT (L53 OR L54)
L56	2	SEA 1840-2000/PY,PRY AND L53
L57	29	SEA 1840-2000/PY,PRY AND L54
L58	5	SEA 1840-2000/PY,PRY AND L55

=> FILE HCA

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=> D L56 1-2 CBIB ABS HITIND

L56 ANSWER 1 OF 2 HCA COPYRIGHT 2007 ACS on STN

136:234757 **Electrolyte membrane, fuel**

**cell**, and manufacture of the **membrane** and the cell. Yamaguchi, Takeo; Nakao, Shinichi (Foundation for Scientific Technology Promotion, Japan). Jpn. Kokai Tokkyo Koho JP 2002083612 A 20020322, 11 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2000-272203 20000907.

AB The **electrolyte membrane** has a **H conductive** polymer filled in the pores of a MeOH- and H<sub>2</sub>O- **non-swellable porous substrate**. The **membrane** is prepd. by bonding a 1st polymer with its 1 end to the pores of a **porous substrate**, swell resistant to org. solvent or water, and bonding a 2nd polymer to the other end of the 1st polymer; where the 2 polymers are the same or different but are both **H conductive**. The **fuel cell** has the **electrolyte membrane** between a cathode and an anode, and is prepd. by forming a 1st electrode from a sol, forming a porous film on the electrode, forming an **electrolyte membrane** by the above method using the porous film, and applying a 2nd electrode on the **electrolyte membrane**.

IC ICM H01M008-02

ICS C08J009-40; H01M008-10; C08L027-18; C08L079-08

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **fuel cell proton conducting**

polymer **electrolyte membrane** manuf

IT **Fuel cell electrolytes**

(structure and manuf. of **proton conducting polymer grafted in porous Teflon membranes for fuel cell electrolytes**)

IT Fluoropolymers, uses

(structure and manuf. of **proton conducting polymer grafted in porous Teflon membranes for fuel cell electrolytes**)

IT 9002-84-0, Teflon

(structure and manuf. of **proton conducting polymer grafted in porous Teflon membranes for fuel cell electrolytes**)

IT 79-10-7, Acrylic acid, uses 1184-84-5, Vinylsulfonic acid

(structure and manuf. of **proton conducting polymer grafted in porous Teflon**)

**membranes for fuel cell  
electrolytes)**

L56 ANSWER 2 OF 2 HCA COPYRIGHT 2007 ACS on STN

130:67406 Characterization of an Amphoteric-Charged Layer Grafted to the  
**Pore Surface of a Porous**

**Membrane.** Jimbo, Toshihiko; Tanioka, Akihiko; Minoura,  
Norihiro (Department of Organic and Polymeric Materials, Tokyo  
Institute of Technology, Meguro-ku Tokyo, 152-8552, Japan).

Langmuir, 14(25), 7112-7118 (English) **1998**. CODEN:

LANGD5. ISSN: 0743-7463. Publisher: American Chemical Society.

AB Porous **membranes** having amphoteric charge groups were prep'd. by  
heterogeneous graft polymn. from aq. soln. contg. acrylic acid and  
(N,N-dimethylamino)propyl acrylamide. The charging properties of the  
amphoteric charge groups grafted to the **pore surface** were  
investigated by  $\zeta$  potentials obtained from streaming potential  
measurements. Theor. development in terms of the amphoteric **pore**  
**surface** was attempted by introducing a site dissocn. model of pH-  
dependent  $\zeta$  potentials. The theor. model is based on the assumption  
that the surface charge arises only from the protonation and  
deprotonation of the charged surface groups exposed to **electrolyte**  
soln. Good fits between exptl. results and theor. equations were  
attained, and thereby the isoelec. point, dissocn. const., apparent  
surface site d., and acid-to-base ratio of the amphoteric **pore**  
**surface** were det'd. Depending on the variation in the feed monomer  
ratio for graft polymn., these parameters correspondingly changed.  
If we assumed that the acid-to-base ratio of the amphoteric **pore**  
**surface** corresponds to that in the whole **membrane**, the net charge d.  
of the **membrane** quant. obtained from the potentiometric titrn. gave  
the resp. charge densities of acidic and basic groups using the acid-  
to-base ratio det'd. from the site dissocn. model. Here we proposed  
an approach to characterize the amphoteric-charged **pore surface** by  
the pH-dependent  $\zeta$  potential and its theor. modeling.

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 35

ST acrylic acid dimethylaminopropyl acrylamide **graft**  
**copolymer porous membrane**

IT Dissociation constant

**Membranes**, nonbiological

Streaming potential

Surface electric charge

Zeta potential

(characterization of amphoteric-charged layer grafted to  
**pore surface of a porous**  
**membrane**)

IT Polymerization

(graft; characterization of amphoteric-charged layer grafted to

**pore surface of a porous membrane)**

IT 110-18-9

(additive; characterization of amphoteric-charged layer grafted to **pore surface of a porous membrane)**

IT 93445-97-7, Acrylic acid-3-(N,N-Dimethylaminopropyl)acrylamide copolymer

(characterization of amphoteric-charged layer grafted to **pore surface of a porous membrane)**

=> D L57 1-29 CBIB ABS HITIND

L57 ANSWER 1 OF 29 HCA COPYRIGHT 2007 ACS on STN

138:76230 Separator for lithium ion secondary battery. Daido, Takahiro; Igarashi, Satoshi; Nishikawa, Satoshi; Honmoto, Hiroyuki; Minematsu, Hiroyoshi (Japan). U.S. Pat. Appl. Publ. US 2003017386 A1 20030123, 7 pp., Cont.-in-part of U.S. Pat. Appl. 2003, 3,363. (English). CODEN: USXXCO. APPLICATION: US 2002-180968 20020627. PRIORITY: US 2001-959538 20011029; JP 2000-61674 20000307; JP 2000-127309 20000427; JP 2000-323795 20001024.

AB A separator, used for a lithium ion secondary battery that produces emf. by lithium doping/dedoping, is composed of a **porous** film comprising an org. polymer (component A) which can swell in an **electrolyte** soln. to retain it, surrounding a nonwoven fabric which cannot swell in the **electrolyte** soln., the **porous** film including an **electrolyte** soln. **non-swelling** org. polymer with a m.p. of 210° or above (component B) and an **electrolyte** soln. **non-swelling** org. polymer with a m.p. of 180° or below (component C), wherein component B is incorporated in the fiber composing the nonwoven fabric. The separator is highly safe and exhibits low redn. mech. properties with respect to org. solvents.

IC ICM H01M002-16

ICS H01M002-18

INCL 429142000; X42-914.4; X42-925.4

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

L57 ANSWER 2 OF 29 HCA COPYRIGHT 2007 ACS on STN

138:26848 Plasma polymerization of ion conducting polymer **electrolyte membranes**. Finsterwalder, F.; Joos,

M.; Frey, H.; Hambitzer, G. (Johnson Matthey Technology Centre, Reading, RG4 9NH, UK). GDCh-Monographie, 21(Elektrochemische Verfahren fuer Neue Technologien), 257-265 (German) **2000**.

CODEN: GDCHAI. Publisher: Gesellschaft Deutscher Chemiker.

AB Ion conductive **membrane** films were prep'd. by a plasma polymn. process using a PTFE target and sulfur components, e.g. SO<sub>2</sub>. Mass spectrometric investigations gave little or no hint to the formation of SO<sub>3</sub> or sulfonic acid groups responsible for the **proton cond.** The highest **membrane** conductivities ( $> 10^{-4}$  S/cm) were achieved with chlorosulfonic acid involved in the plasma polymn. process. Nafion **membranes** coated with thin layers of these plasma polymers showed a slightly selectively **decreased methanol diffusion** compared to the **proton cond.** Plasma polymer coating could offer a way to suppress methanol crossover and maintain the **proton cond.** in the direct methanol **fuel cell**.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38, 72, 76

ST **proton conductive membrane** plasma  
polymn SOFC; **fuel cell** methanol conductive PTFE  
sulfonate **membrane**

IT Polyoxyalkylenes, uses  
(fluorine- and sulfo-contg., ionomers; plasma polymn. of  
**proton conducting polymer electrolyte**  
**fuel cell membranes**)

IT Polymerization  
(**graft**, plasma; plasma polymn. of **proton**  
**conducting polymer electrolyte fuel**  
**cell membranes**)

IT Diffusion  
(of methanol; plasma polymn. of **proton**  
**conducting polymer electrolyte fuel**  
**cell membranes**)

IT Conducting polymers  
**Fuel cell electrolytes**  
**Fuel cell separators**  
Mass spectra  
(plasma polymn. of **proton conducting polymer**  
**electrolyte fuel cell**  
**membranes**)

IT Fluoropolymers, uses  
(polyoxyalkylene-, sulfo-contg., ionomers; plasma polymn. of  
**proton conducting polymer electrolyte**  
**fuel cell membranes**)

IT Ionomers  
(polyoxyalkylenes, fluorine- and sulfo-contg.; plasma polymn. of  
**proton conducting polymer electrolyte**  
**fuel cell membranes**)

IT Ionic conductivity  
(**proton**; plasma polymn. of **proton**  
**conducting polymer electrolyte fuel**  
**cell membranes**)

- IT **Fuel cells**  
(solid oxide; plasma polymn. of **proton conducting polymer electrolyte fuel cell membranes**)
- IT Fluoropolymers, uses  
(sulfonic acid group **graft**; plasma polymn. of **proton conducting polymer electrolyte fuel cell membranes**)
- IT 9002-84-0D, PTFE, sulfonic acid group **graft**  
(plasma polymn. of **proton conducting polymer electrolyte fuel cell membranes**)
- IT 66796-30-3, Nafion 117 77950-55-1, Nafion 115  
(plasma polymn. of **proton conducting polymer electrolyte fuel cell membranes**)
- L57 ANSWER 3 OF 29 HCA COPYRIGHT 2007 ACS on STN  
137:35458 Crosslinked or modified polymeric **porous** films as separators for batteries with nonaqueous **electrolytes**.  
Kenichiro, Kami; Hiroshi, Ueshima; Ryuichirou, Shinkai; Norikazu, Hosokawa; Manabu, Yamada; Hideo, Amaki; Tomoaki, Tamura (Denso Corp., Japan). Fr. Demande FR 2814284 A1 20020322, 75 pp.  
(French). CODEN: FRXXBL. APPLICATION: FR 2001-12110 20010919.  
PRIORITY: JP 2000-287145 20000921; JP 2001-145341 20010515.
- AB **Non-swelling** polymeric separators for batteries with non-aq. **electrolytes** are prep'd. by crosslinking or modifying a **porous** polymer film with compds. that formed the crosslinks or added chains by at least 2 carbon atoms away from the linking units between the monomers (e.g., the ester linkage of polyesters). The polymeric film can be selected from polybenzimidazoles, polyimides, polyether-polyimides, polyamide-polyimides, polyphenylene sulfides, polyphenylene oxides, polyether-polysulfones, polysulfones, polyether-polyketones, aramides, satd. polyesters, polyoxymethylenes, etc. Suitable crosslinking agents or modifiers include acrylates, vinyl compds., and functionalized (unsatd.) alkoxysilanes.
- IC ICM H01M010-38
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38
- ST **nonswelling** battery separator nonaq **electrolyte**;  
crosslinking modification polymeric battery separator nonaq **electrolyte**; polyester crosslinked film battery separator nonaq **electrolyte**
- IT Polysiloxanes, uses  
(acrylic, crosslinking or modifying agent; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)

- IT Polyamide fibers, uses  
(aramid, crosslinked or modified, battery separators; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)
- IT Polyesters, uses  
(arom., Vylon KS001, crosslinked or modified, battery separators; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)
- IT Primary battery separators  
Secondary battery separators  
(crosslinked or modified polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)
- IT Fluoropolymers, uses  
Polyamides, uses  
Polybenzimidazoles  
Polyesters, uses  
Polyimides, uses  
Polyoxymethylenes, uses  
Polyoxyphenylenes  
Polysulfones, uses  
Polythiophenylenes  
(crosslinked or modified, battery separators; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)
- IT Battery **electrolytes**  
(nonaq.; crosslinked or modified polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)
- IT Polyimides, uses  
(polyamide-, crosslinked or modified, battery separators; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)
- IT Polyimides, uses  
Polyketones  
Polysulfones, uses  
(polyether-, crosslinked or modified, battery separators; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)
- IT Polyamides, uses  
Polyethers, uses  
(polyimide-, crosslinked or modified, battery separators; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)
- IT Polyethers, uses  
(polyketone-, crosslinked or modified, battery separators; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)
- IT Acrylic polymers, uses



(polysiloxane-, crosslinking or modifying agent; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)

- IT Polyethers, uses  
(polysulfone-, crosslinked or modified, battery separators; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)
- IT 2530-85-0,  $\gamma$ -(Methacryloxypropyl)trimethoxysilane  
(KBM503, crosslinking or modifying agent; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)
- IT 4369-14-6, 2-Propenoic acid, 3-(trimethoxysilyl)propyl ester  
(KBM5103, crosslinking or modifying agent; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)
- IT 1025-15-6, Triallyl isocyanurate  
(TAIC, crosslinking or modifying agent; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)
- IT 9016-80-2, Poly(methylpentene) 9020-73-9, Polyethylene naphthalate  
24937-79-9, Poly(vinylidene fluoride) 24968-11-4, Polyethylene naphthalate  
24968-12-5, Polybutylene terephthalate 25038-59-9, Polyethylene terephthalate, uses  
26062-94-2, Polybutylene terephthalate 28779-82-0, Polybutylene naphthalate 51806-50-9, Polybutylene naphthalate  
(crosslinked or modified, battery separators; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)
- IT 75-94-5, Vinyltrichlorosilane 78-08-0, Vinyltriethoxysilane  
97-90-5, Ethylene glycol dimethacrylate 131-17-9, Diallyl phthalate  
1067-53-4, Vinyltris( $\beta$ -methoxyethoxy)silane 1321-74-0, Divinylbenzene, uses  
1337-81-1, Vinylpyridine 2768-02-7, Vinyltrimethoxysilane 3030-60-2, Allyl isocyanurate  
3290-92-4, Trimethylolpropane trimethacrylate 6294-79-7, Diallyl isocyanurate  
21142-29-0,  $\gamma$ -(Methacryloxypropyl)triethoxysilane 25013-15-4, Vinyltoluene  
65100-04-1,  $\gamma$ -(Methacryloxypropyl)methyldiethoxysilane  
(crosslinking or modifying agent; polymeric **porous** films as separators for batteries with nonaq. **electrolytes**)

L57 ANSWER 4 OF 29 HCA COPYRIGHT 2007 ACS on STN

136:153933 Porous polyolefin film and its manufacture for battery and capacitor. Nomi, Shunsuke; Uetani, Yoshihiro (Nitto Denko Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2002047372 A 20020212, 9 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2000-232126 20000731.

AB The porous film contains high-mol.-wt. polyolefins (A) 50-99, polymer **electrolytes** 1-25, and auxiliary resins 0-25 wt.%, where 40-100 wt.% of A have wt. av. mol. wt.  $\geq 10 + 105$ . The film is manufd. from a gelled mixt. contg. A contg. ultrahigh-mol.-wt. polyolefin having wt. av. mol. wt.  $\geq 10 + 105$ , a polymer **electrolyte**, and an auxiliary resin, and a solvent by sheet forming, rolling, stretching, and then removing a solvent. A battery and a capacitor equipped with the film are also claimed. The film provides high prodn. efficiency, strength, and good **electrolyte** retaining property.

IC ICM C08J009-26  
ICS C08L023-00; H01G009-02; H01M002-16; C08L101-00

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38, 76

ST porous film polyolefin UHMWPE polymer **electrolyte** battery;  
capacitor porous film polyolefin polymer **electrolyte**

IT **Porous materials**  
(films; manuf. of porous polyolefin film contg. polymer **electrolyte** for battery and capacitor)

IT Capacitors  
Secondary batteries  
Secondary battery separators  
(manuf. of porous polyolefin film contg. polymer **electrolyte** for battery and capacitor)

IT Polyolefins  
Polyoxyalkylenes, uses  
(manuf. of porous polyolefin film contg. polymer **electrolyte** for battery and capacitor)

IT Synthetic rubber, uses  
(norbornene, film contg.; manuf. of porous polyolefin film contg. polymer **electrolyte** for battery and capacitor)

IT Films  
(porous; manuf. of porous polyolefin film contg. polymer **electrolyte** for battery and capacitor)

IT Paraffin oils  
(solvents; manuf. of porous polyolefin film contg. polymer **electrolyte** for battery and capacitor)

IT 9002-88-4, Hizex Million 240S 25322-68-3, PEO 18 126925-06-2,  
Ethylene oxide-propylene oxide **graft copolymer**  
(manuf. of **porous** polyolefin film contg. polymer **electrolyte** for battery and capacitor)

L57 ANSWER 5 OF 29 HCA COPYRIGHT 2007 ACS on STN

136:105111 Polymer **electrolyte fuel cell**.

Yasumoto, Eiichi; Yoshida, Akihiko; Uchida, Makoto; Gyoten, Hisaaki; Hatoh, Kazuhito; Sugawara, Yasushi; Morita, Junji; Kanbara, Teruhisa; Takebe, Yasuo; Hosaka, Masato; Niikura, Junji (Matsushita Electric Industrial Co., Ltd., Japan; et al.). PCT Int. Appl. WO

2002003489 A1 20020110, 61 pp. DESIGNATED STATES: W: CN, KR, US;  
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL,  
PT, SE, TR. (Japanese). CODEN: PIXXD2. APPLICATION: WO  
2001-JP5684 20010629. PRIORITY: JP 2000-200656 20000703; JP  
2000-204633 20000706; JP 2000-204719 20000706.

- AB The **fuel cell** has a **H<sup>+</sup>**  
**conducting** polymer **electrolyte membrane**, 2 gas diffusion electrodes  
having catalyst layers holding the **electrolyte membrane**, and  
conductive separators supplying reaction gases to resp. electrodes;  
where the catalyst layers contain conductive C particles, catalytic  
metals loaded on the C particles, and a **H<sup>+</sup> conductive** polymer  
**electrolyte**, filled in the fine **pores** in the agglomerate structure of  
the C particles.
- IC ICM H01M004-86  
ICS H01M004-88; H01M004-96
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST polymer **electrolyte fuel cell**  
electrode catalyst
- IT **Fuel cell** electrodes  
(catalyst layers contg. **proton conducting**  
polymer **electrolyte** in **pores** of carbon  
particle agglomerates for **fuel cell**  
electrodes)
- IT Carbon black, uses  
(catalyst layers contg. **proton conducting**  
polymer **electrolyte** in **pores** of carbon  
particle agglomerates for **fuel cell**  
electrodes)
- IT Polyoxyalkylenes, uses  
(fluorine-contg., **graft**, sulfo group-contg.; catalyst  
layers contg. **proton conducting** polymer  
**electrolyte** in **pores** of carbon particle  
agglomerates for **fuel cell** electrodes)
- IT Sulfonic acids, uses  
(perfluorocarbon; catalyst layers contg. **proton**  
**conducting** polymer **electrolyte** in **pores**  
of carbon particle agglomerates for **fuel cell**  
electrodes)
- IT Fluoropolymers, uses  
(polyoxyalkylene-, **graft**, sulfo group-contg.; catalyst  
layers contg. **proton conducting** polymer  
**electrolyte** in **pores** of carbon particle  
agglomerates for **fuel cell** electrodes)
- IT Ionomers  
(**proton conductive**; catalyst layers contg.  
**proton conducting** polymer **electrolyte**  
in **pores** of carbon particle agglomerates for

**fuel cell** electrodes)

IT 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses  
(catalyst layers contg. **proton conducting**  
polymer **electrolyte** in **pores** of carbon  
particle agglomerates for **fuel cell**  
electrodes)

L57 ANSWER 6 OF 29 HCA COPYRIGHT 2007 ACS on STN

135:26880 **Porous** pattern forming **material**, method  
for pattern formation using same, and method for manufacture of  
**electrolysis** cells, filters, **porous** carbon  
**materials**, capacitor, and catalyst layer of fuel batteries  
using same. Hiraoka, Toshiro; Asakawa, Koji; Akasaka, Yoshihiro;  
Hotta, Yasuyuki (Toshiba Corp., Japan). Jpn. Kokai Tokkyo Koho JP  
2001151834 A 20010605, 62 pp. (Japanese). CODEN: JKXXAF.  
APPLICATION: JP 2000-169263 20000606. PRIORITY: JP 1999-159479  
19990607; JP 1999-262326 19990916.

AB The title material contains a block copolymer or a graft copolymer  
for forming pattern of a microphase sepn. structure, wherein the  $\geq 2$   
kinds of the polymer chains of the block copolymer or the graft  
copolymer has  $\geq 1.4$  of the monomer based  $N/(N_c - N_o)$  where N is total  
element no. in the monomer,  $N_c$  is the no. of carbon in the monomer,  
and  $N_o$  is the no. of oxygen in the monomer. The method provides the  
2- and 3-dimensional pattern in nanometer size with the simple  
process.

IC ICM C08F297-02

ICS C08F299-00; C08G081-02; C08G083-00; C08J009-26; H01L021-3065;  
H01M002-16; H01M004-88; H01M004-96; C01B031-02; C04B035-52;  
H01M004-58; H01M010-40; C08L101-00

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and  
Other Reprographic Processes)

Section cross-reference(s): 35, 52, 76

ST **porous** pattern **material** method copolymer  
microphase sepn

IT Electric circuits

**Fuel cells**

(copolymer for **porous** pattern forming **material**  
)

IT Polyamic acids

(copolymer for **porous** pattern forming **material**  
)

IT Photolithography

(**porous** pattern forming **material**, method for  
pattern formation using same, and method for manuf. of  
**electrolysis** cells, filters, **porous** carbon  
**materials**, capacitor, and catalyst layer of fuel  
batteries using same)

IT 25014-10-2P, Isoprene-methyl methacrylate copolymer 25014-15-7P, 2-Vinylpyridine homopolymer 25014-41-9P, Acrylonitrile homopolymer 26353-79-7P, Acrylonitrile-propylene oxide copolymer 32197-39-0P, 3,3',4,4'-Biphenyltetracarboxylic acid dianhydride-1,4-phenylenediamine copolymer, sru 106911-77-7P, Styrene-methyl methacrylate block copolymer 108614-86-4P, Styrene-2-vinylpyridine block copolymer 108689-93-6P, Ethylene oxide-acrylonitrile block copolymer 109584-39-6P, Ethylene oxide-styrene **graft copolymer** 120964-16-1P, Acrylic acid-methyl methacrylate block copolymer 127381-17-3P, Ethylene oxide-hexamethylcyclotrisiloxane block copolymer 128706-32-1P 339315-59-2P, 1,2-Butadiene-ethylene oxide block copolymer 343253-67-8P 343253-69-0P 343253-70-3P 343253-71-4P 343253-72-5P 343253-73-6P 343253-74-7P 343253-76-9P 343253-77-0P 343253-78-1P 343253-79-2P

(**copolymer** for **porous** pattern forming **material**)

IT 9003-53-6D, Poly(styrene), carboxy terminated 9011-14-7D, Methyl methacrylate homopolymer, N-(4-aminobutyl)amide terminated 160507-60-8D, Styrene-dimethyldihydroxysilane block copolymer, TMS-terminated

(**porous** pattern forming **material**)

L57 ANSWER 7 OF 29 HCA COPYRIGHT 2007 ACS on STN

132:267536 A comparative investigation of **proton** and methanol **transport** in fluorinated ionomeric **membranes**.

Tricoli, V.; Carretta, N.; Bartolozzi, M. (Dipartimento di Ingegneria Chimica, Chimica Industriale e Scienza dei Materiali, University of Pisa, Pisa, 56126, Italy). Journal of the Electrochemical Society, 147(4), 1286-1290 (English) **2000**. CODEN: JESOAN. ISSN: 0013-4651. Publisher: Electrochemical Society.

AB **Proton conductivities** as well as methanol permeabilities were investigated for two com. partially fluorinated ionomeric **membranes**: IonClad R-1010 and R-4010, both manufd. by Pall Company. The investigation was carried out in the temp. range 20 to 60°C. The results were compared with data for Nafion 117 (DuPont) obtained in the same temp. range. We found that IonClad **membranes**, while exhibiting **proton cond.** approx. equal to that of Nafion 117, are considerably **less permeable** to **methanol**. The permeability measured for R-4010 **membranes** was almost four times smaller than for the Nafion **membrane**. These characteristics together with the low cost make the IonClad **membranes** interesting potential candidates for application in the direct methanol **fuel cell**.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology) Section cross-reference(s): 38, 72

ST fluorinated ionomer **membrane electrolyte**

**fuel cell; polymer electrolyte  
fuel cell**

- IT Fluoropolymers, uses  
(**grafted**, styrenesulfonate-contg., **membranes**;  
**proton** and methanol **transport** in fluorinated  
ionomeric **membranes** as **fuel cell**  
**electrolytes**)
- IT **Fuel cell electrolytes**  
Permeability  
(**proton** and methanol **transport** in fluorinated  
ionomeric **membranes** as **fuel cell**  
**electrolytes**)
- IT Ionic **conductivity**  
(**proton**; **proton** and methanol  
**transport** in fluorinated ionomeric **membranes** as  
**fuel cell electrolytes**)
- IT 116-15-4D, Perfluoropropylene, polymers with tetrafluoroethylene,  
styrene sulfonate-group contg. 26914-43-2D, Styrenesulfonic acid,  
perfluoropropylene-tetrafluoroethylene polymers contg. 94699-21-5,  
Raipore r-4010 111483-87-5, Raipore 1010  
(**proton** and methanol **transport** in fluorinated  
ionomeric **membranes** as **fuel cell**  
**electrolytes**)
- IT 67-56-1, Methanol, uses 116-14-3D, Tetrafluoroethylene, polymers  
with perfluoropropylene, styrene sulfonate-group contg.  
(**proton** and methanol **transport** in fluorinated  
ionomeric **membranes** as **fuel cell**  
**electrolytes**)
- L57 ANSWER 8 OF 29 HCA COPYRIGHT 2007 ACS on STN
- 130:198823 Solid polymer **electrolyte** including polymer-grafted  
inorganic oxide particles and its application. Takeuchi, Masataka;  
Nishioka, Ayako (Showa Denko K. K., Japan). Jpn. Kokai Tokkyo Koho  
JP 11031415 A **19990202** Heisei, 22 pp. (Japanese).  
CODEN: JKXXAF. APPLICATION: JP 1997-185579 19970710.
- AB The **electrolyte**, with high ion cond., excellent film strength, and  
good ease to handling, comprises macromol.-copolymerized inorg. oxide  
microparticles and a salt **electrolyte**. The covalent bonds between  
the macromol. and microparticles may comprise structure of  $\text{CH}_2\text{CR}_1\text{CO}_2$   
or  $\text{CH}_2\text{CR}_2\text{CO}(\text{OR}_3)_x\text{NHCO}_2$  ( $\text{R}_1, \text{R}_2 = \text{H, alkyl}$ ;  $\text{R}_3 = \text{bivalent group}$ ;  $x =$   
 $0-10$ ). A battery, a double-layer capacitor, and a composite  
electrode using the polymer **electrolyte**, are also claimed. A lithium  
secondary battery comprising the polymer **electrolyte** and an anode  
active mass selected from (i) a carbonaceous material occluding (an  
alloy or ion of) Li, (ii) an inorg. oxide, (iii) an inorg.  
chalcogenide, or (i.v.) a conducting polymer, is also claimed.
- IC ICM H01B001-12

ICS C08L075-04; H01G009-025; H01M010-40; C08K003-00; C08L101-00

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 38, 76

ST acrylic polyoxyalkylene grafted alumina polymer **electrolyte**  
; capacitor battery **electrolyte** polymer grafted alumina;  
strength cond improved polyoxyalkylene grafted **electrolyte**  
; lithium secondary battery polymer **electrolyte**  
reliability

IT Battery anodes  
(active mass; pore-free solid **electrolyte** contg.  
acrylic polymer-grafted oxide particles for capacitor and  
battery)

IT Conducting polymers  
(anode active mass; pore-free solid **electrolyte** contg.  
acrylic polymer-grafted oxide particles for capacitor and  
battery)

IT Carbonaceous materials (technological products)  
Oxides (inorganic), uses  
(anode active mass; pore-free solid **electrolyte** contg.  
acrylic polymer-grafted oxide particles for capacitor and  
battery)

IT Electrodes  
(composite; pore-free solid **electrolyte** contg. acrylic  
polymer-grafted oxide particles for capacitor and battery)

IT Capacitors  
(double layer; solid **electrolyte** contg. acrylic  
polymer-grafted oxide particles for capacitor and battery with  
good reliability)

IT **Polymerization**  
(**graft**; pore-free solid **electrolyte**  
contg. acrylic polymer-grafted oxide particles for capacitor and  
battery)

IT Chalcogenides  
(inorg., anode active mass; pore-free solid **electrolyte**  
contg. acrylic polymer-grafted oxide particles for capacitor and  
battery)

IT Secondary batteries  
(lithium; pore-free solid **electrolyte** contg. acrylic  
polymer-grafted oxide particles for capacitor and battery)

IT Battery electrodes  
Hybrid organic-inorganic **materials**  
Polymer **electrolytes**  
(**pore**-free solid **electrolyte** contg. acrylic  
polymer-grafted oxide particles for capacitor and battery)

IT Coconut (Cocos nucifera)  
(shell, active carbon from; pore-free solid **electrolyte**  
contg. acrylic polymer-grafted oxide particles for capacitor and

- battery)
- IT 2530-85-0  
(KBM 503P; pore-free solid **electrolyte** contg. acrylic polymer-grafted oxide particles for capacitor and battery)
- IT 7440-44-0, Carbon, uses  
(anode active mass; pore-free solid **electrolyte** contg. acrylic polymer-grafted oxide particles for capacitor and battery)
- IT 429-06-1, Tetraethylammonium tetrafluoroborate 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate  
(pore-free solid **electrolyte** contg. acrylic polymer-grafted oxide particles for capacitor and battery)
- IT 220456-47-3P 220736-44-7P  
(pore-free solid **electrolyte** contg. acrylic polymer-grafted oxide particles for capacitor and battery)
- IT 220293-97-0P 220736-45-8P  
(pore-free solid **electrolyte** contg. acrylic polymer-grafted oxide particles for capacitor and battery)

L57 ANSWER 9 OF 29 HCA COPYRIGHT 2007 ACS on STN

130:141641 Polymer **electrolyte** batteries. Uesugi, Makoto; Kamino, Maruo; Fujimoto, Masahisa; Noma, Toshiyuki; Nishio, koji (Sanyo Electric Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 11040197 A **19990212** Heisei, 8 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1997-198029 19970724.

- AB The batteries have a polymer **electrolyte** filled in the pores of a microporous **membrane** held between a cathode-anode pair, where the **membrane** has a porosity  $\geq 80$  vol.% and the **electrolyte** fills 20-90% of the total pore vol. Preferably, the polymer **electrolyte** has an **electrolyte** soln. contained in a polymer, e.g, a polystyrene having polyethylene oxide side chains; and the **membrane** is polyethylene or polypropylene.
- IC ICM H01M010-40  
ICS H01M002-16
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST battery polystyrene polyethylene oxide polymer **electrolyte** ; polyethylene **membrane** battery polymer **electrolyte**; polypropylene **membrane** battery polymer **electrolyte**
- IT Battery **electrolytes**  
(polymer **electrolytes** with porous polyethylene or polypropylene **membrane** supports for secondary lithium batteries)
- IT Fluoropolymers, uses  
(polymer **electrolytes** with porous polyethylene or polypropylene **membrane** supports for secondary lithium batteries)



IT 96-49-1, Ethylene carbonate 616-38-6, Dimethyl carbonate  
 7791-03-9, Lithium perchlorate 9002-88-4, Polyethylene  
 9003-07-0, Polypropylene 24937-79-9, Poly(vinylidene fluoride)  
 109584-39-6, Ethylene oxide-styrene **graft**  
**copolymer**  
 (polymer electrolytes with porous  
 polyethylene or polypropylene **membrane** supports for  
 secondary lithium batteries)

L57 ANSWER 10 OF 29 HCA COPYRIGHT 2007 ACS on STN  
 130:27228 Polymer membrane batteries. Kono, Koichi; Takita, Kotaro;  
 Kaimai, Norimitsu (Tonen Chemical Corp., Japan). Jpn. Kokai Tokkyo  
 Koho JP 10302835 A **19981113** Heisei, 9 pp. (Japanese).  
 CODEN: JKXXAF. APPLICATION: JP 1997-120254 19970423.

AB The batteries, esp. secondary lithium batteries, have a cathode, an  
 anode, and a thin aprotic **electrolyte** membrane contg. a microporous  
 polyolefin film. Preferably, the cathode and/or anode are  
 immobilized liq. film conductors, having an electron conductive  
**material** contg. **microporous** polyolefin film **substrate**.

IC ICM H01M010-40  
 ICS H01M010-40; H01M006-18; H01M006-22

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT Secondary batteries  
 (lithium; microporous polyolefin host membranes for  
**electrolytes** and electrodes in secondary lithium  
 batteries)

IT Battery **electrolytes**  
 (microporous polyolefin host membranes for battery  
**electrolytes** and electrodes)

IT Polyolefins  
 (microporous polyolefin host membranes for battery  
**electrolytes** and electrodes)

IT Battery electrodes  
 (microporous polyolefin host membranes for electrodes contg.  
 immobilized **electrolyte** in secondary lithium batteries)

IT Carbon black, uses  
 Coke  
 (microporous polyolefin host membranes for electrodes contg.  
 immobilized **electrolyte** in secondary lithium batteries)

IT 96-33-3, Methyl acrylate  
 (Me acrylate **grafted microporous** polyolefin  
 host membranes for battery **electrolytes** and electrodes)

IT 108-32-7, Propylene carbonate 21324-40-3, Lithium  
 hexafluorophosphate  
 (microporous polyolefin host membranes for battery  
**electrolytes**)

IT 9002-88-4, Polyethylene

(microporous polyolefin host membranes for battery **electrolytes** and electrodes)

IT 12057-17-9, Lithium manganese oxide (LiMn<sub>2</sub>O<sub>4</sub>)  
(microporous polyolefin host membranes for electrodes contg.  
immobilized **electrolyte** in secondary lithium batteries)

L57 ANSWER 11 OF 29 HCA COPYRIGHT 2007 ACS on STN

130:5699 Hybrid **electrolyte** sheets for nonaqueous batteries  
and the batteries. Hoshi, Nobuto; Kuroki, Masakatsu (Asahi Chemical  
Industry Co., Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 10294130 A  
**19981104** Heisei, 8 pp. (Japanese). CODEN: JKXXAF.  
APPLICATION: JP 1997-101384 19970418.

AB The hybrid **electrolyte** sheets have a **nonswelling porous** polymer  
**membrane** filled with a nonaq. **electrolyte** soln., capable of  
impregnating the **membrane** under atm. pressure; where the sheets  
retains ≥50% of the **electrolyte** soln., after pressed at 0.25 kg/cm<sup>2</sup>  
between a pair of filter paper for 2 h, and shows a permeation of the  
nonaq. **electrolyte** soln. ≥50 kg/h.m<sup>2</sup>.atm at 25° and 1 atm hydrostatic  
pressure. The batteries have the **electrolyte** sheets between their  
electrodes.

IC ICM H01M010-40

ICS H01M002-16; H01M006-22

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST battery nonaq **electrolyte nonswelling** polymer  
**membrane**

IT Battery **electrolytes**  
(characteristics for **nonswelling porous**  
polymer **membranes** for hybrid **electrolyte**  
sheets for secondary lithium batteries)

IT Fluoropolymers, uses  
(characteristics for **nonswelling porous**  
polymer **membranes** for hybrid **electrolyte**  
sheets for secondary lithium batteries)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate  
14283-07-9, Lithium fluoroborate  
(characteristics for **nonswelling porous**  
polymer **membranes** for hybrid **electrolyte**  
sheets for secondary lithium batteries)

IT 24937-79-9, Poly(vinylidene fluoride) 215653-66-0D, crosslinked  
215653-67-1D, crosslinked  
(characteristics for **nonswelling porous**  
polymer **membranes** for hybrid **electrolyte**  
sheets for secondary lithium batteries)

L57 ANSWER 12 OF 29 HCA COPYRIGHT 2007 ACS on STN

129:97752 Hybrid **electrolytes** and batteries using the  
**electrolytes**. Aihara, Yuichi (Yuasa Battery Co., Ltd.,

Japan). Jpn. Kokai Tokkyo Koho JP 10189048 A **19980721**  
Heisei, 4 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP  
1996-340753 19961220.

- AB The **electrolytes** are alkylene oxide **grafted microporous polymer membranes** swelled by an **electrolyte** soln. contg. a metal salt dissolved in a nonaq. solvent. The **membrane** is preferably polyethylene **membrane**, the alkylene oxide is mono-, di-, and/or tri-acrylate ester, and the metal salt is Li salt. The batteries have the **electrolyte** between their cathodes and anodes.
- IC ICM H01M010-40  
ICS C08F255-02; C08L051-06; C08F299-02
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
- ST battery alkylene oxide grafted polyethylene **electrolyte**;  
lithium salt polymer hybrid **electrolyte** battery
- IT Battery **electrolytes**  
(comps. of hydride **electrolytes** contg. ethylene oxide grafted polyethylene **membranes** for lithium batteries)
- IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate  
9002-88-4, Polyethylene 21324-40-3, Lithium hexafluorophosphate  
26403-58-7, Poly(ethylene glycol) monoacrylate 26570-48-9,  
Poly(ethylene glycol) diacrylate  
(comps. of hydride **electrolytes** contg. ethylene oxide grafted polyethylene **membranes** for lithium batteries)
- L57 ANSWER 13 OF 29 HCA COPYRIGHT 2007 ACS on STN
- 129:83760 Thin aprotic **electrolyte** film, immobilized liquid film conductor, and polymer cell. Kono, Koichi; Takita, Kotaro; Kaimai, Norimitsu (Tonen Chemical Corp., Japan). PCT Int. Appl. WO 9826429 A1 **19980618**, 51 pp. DESIGNATED STATES: W: CA, KR, US; RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (Japanese). CODEN: PIXXD2. APPLICATION: WO 1997-JP4561 19971211. PRIORITY: JP 1996-351903 19961211; JP 1997-13300 19970109; JP 1997-96436 19970331.
- AB A thin aprotic **electrolyte** film comprising an aprotic **electrolyte** soln. and a microporous polyolefin film which has an affinity for the soln. and which holds the soln. infiltrated thereinto. It can be produced, e.g., by a method comprising modifying a **microporous** polyolefin film by **grafting** a monomer sol. in an aprotic **electrolyte** soln. onto the polyolefin, or coating the film with a terminal-modified polypropylene sol. in the soln., or coating the film with a wax sol. in the soln. An aprotic **electrolyte** soln. is infiltrated into a film obtained by imparting affinity for the soln. to a microporous polyolefin film contg. an electron-conducting material to obtain an immobilized liq. film conductor. When the thin aprotic **electrolyte** film based on the **microporous** polyolefin film is used in combination with pos. and neg. electrodes, a polymer cell such as a lithium battery is obtained. When the film conductor based on the

**microporous** polyolefin film contg. an electron-conducting material is used as at least one of pos. and neg. electrodes in combination with the thin aprotic **electrolyte** film, a polymer cell can be obtained which has satisfactory high-rate discharge performance at a lower temp. than conventional lithium batteries, is reduced in self-discharge even at high temps., and well retains its performance after charging over long-term standing.

- IC ICM H01B001-12  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38, 72, 76  
ST aprotic **electrolyte** polyolefin microporous film battery  
IT Electric conductors  
(immobilized liq. film conductor having microporous polyolefin film which has an affinity for aprotic **electrolyte** soln.)  
IT Primary batteries  
(polymer; thin aprotic **electrolyte** film for)  
IT Carbon black, uses  
Paraffin waxes, uses  
Petroleum coke  
Waxes  
(thin aprotic **electrolyte** film contg.)  
IT Battery **electrolytes**  
**Electrolytes**  
(thin aprotic **electrolyte** film having microporous polyolefin film which has an affinity for the aprotic **electrolyte** soln.)  
IT Polyolefins  
(thin aprotic **electrolyte** film having microporous polyolefin film which has an affinity for the aprotic **electrolyte** soln.)  
IT 9002-88-4  
(microporous; thin aprotic **electrolyte** film contg.)  
IT 12057-17-9, Lithium manganese oxide (LiMn2O4) 14283-07-9  
(thin aprotic **electrolyte** film contg.)  
IT 11099-07-3, Stearin  
(thin aprotic **electrolyte** film contg.)  
IT 106974-58-7 119692-50-1, Ethylene-2-ethylhexylacrylate graft copolymer 133028-68-9 135506-24-0, Ethylene-methylacrylate graft copolymer  
(thin aprotic **electrolyte** film contg.)

L57 ANSWER 14 OF 29 HCA COPYRIGHT 2007 ACS on STN  
128:94522 Stabilization of the **porous** silicon **surface**  
by **grafting** of organic groups: direct electrochemical  
methylation. Dubois, T.; Ozanam, E.; Chazalviel, J.-N. (Laboratoire  
de Physique de la Matiere Condensee, CNRS-Ecole Polytechnique,

Palaiseau, 91128, Fr.). Proceedings - Electrochemical Society, 97-7(Pits and Pores: Formation, Properties, and Significance for Advanced Luminescent Materials), 296-310 (English) 1997.

CODEN: PESODO. ISSN: 0161-6374. Publisher: Electrochemical Society.

- AB The hydrogen-coated **surface** of **porous** silicon was substituted with Me groups by anodization in di-Et ether **electrolyte** contg. methyllithium or methylmagnesium iodide. Methylmagnesium iodide exhibits the advantage of providing good **electrolyte** cond. Over 80% substitution of hydrogen by Me groups is then obtained in a few minutes. The obtained material remains bright photoluminescent, and its stability to ageing is improved by about an order of magnitude.
- CC 72-2 (Electrochemistry)  
Section cross-reference(s): 66, 73, 76
- ST stabilization **porous** silicon **grafting** org group;  
electrochem methylation porous silicon stabilization; methyllithium electrochem methylation porous silicon stabilization;  
methylmagnesium iodide electrochem methylation porous silicon;  
hydrogenated porous silicon electrochem methylation; luminescence porous silicon electrochem methylated
- IT Methylation  
(electrochem.; stabilization of **porous** silicon **surface** by **grafting** of org. groups: direct electrochem. methylation of porous silicon in di-Et ether **electrolyte** contg. methyllithium or methylmagnesium iodide)
- IT 917-54-4, Methyllithium  
(reagent and reagent contg. lithium iodide; stabilization of **porous** silicon **surface** by **grafting** of org. groups: direct electrochem. methylation of porous silicon in di-Et ether contg.)
- IT 10377-51-2, Lithium iodide  
(reagent contg. Me lithium; stabilization of **porous** silicon **surface** by **grafting** of org. groups: direct electrochem. methylation of porous silicon using)
- IT 917-64-6, Methylmagnesium iodide  
(stabilization of **porous** silicon **surface** by **grafting** of org. groups: direct electrochem. methylation of porous silicon in di-Et ether contg.)
- IT 7440-21-3, Silicon, properties  
(stabilization of **porous** silicon **surface** by **grafting** of org. groups: direct electrochem. methylation of porous silicon in di-Et ether **electrolyte** contg. methyllithium or methylmagnesium iodide)

**electrolytes** and batteries using the **electrolytes**.

Hoshi, Nobuto; Kuroki, Masakatsu; Minakata, Takashi (Asahi Kasei Kogyo Kabushiki Kaisha, Japan; Minakata, Takashi). PCT Int. Appl. WO 9748106 A1 **19971218**, 72 pp. DESIGNATED STATES: W: CA, CN, JP, KR, MX, US; RW: AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (Japanese). CODEN: PIXXD2. APPLICATION: WO 1997-JP2056 19970613. PRIORITY: JP 1996-152134 19960613; JP 1997-100397 19970417.

AB The **electrolytes** have a **porous** polymer, contg. crosslinked polymer segments and 20-75% gelled components, impregnated with and swollen by an aq. or nonaq. **electrolyte** soln. The **electrolytes** are prep'd. by impregnating the **porous** polymer with the **electrolyte** soln. under **nonswelling** temp. and pressure conditions and swelling the impregnated polymer under proper temp. and pressure conditions. Secondary Li batteries are prep'd. by swelling the **electrolyte** by the above method. The polymer is preferably a vinylidene fluoride or acrylonitrile polymer.

IC ICM H01B001-12

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium battery swollen **porous** polymer **electrolyte**  
; vinylidene fluoride polymer battery **electrolyte** manuf;  
acrylonitrile polymer battery **electrolyte** manuf

IT Battery **electrolytes**

(hybrid **electrolytes** from **electrolyte** soln.  
impregnated and swollen **porous** polymers contg.  
crosslinked segments for secondary lithium batteries)

IT Fluoropolymers, uses

(hybrid **electrolytes** from **electrolyte** soln.  
impregnated and swollen **porous** polymers contg.  
crosslinked segments for secondary lithium batteries)

IT 96-49-1, Ethylene carbonate 108-32-7, Propylene carbonate  
9011-17-0 14283-07-9, Lithium fluoroborate 24937-79-9,  
Poly(vinylidene fluoride) 25014-41-9, Polyacrylonitrile  
(hybrid **electrolytes** from **electrolyte** soln.

impregnated and swollen **porous** polymers contg.  
crosslinked segments for secondary lithium batteries)

L57 ANSWER 16 OF 29 HCA COPYRIGHT 2007 ACS on STN

128:62381 Closure characteristics of ion-track pores with a thermo-responsive function by size exclusion method. Yoshida, Masaru; Asano, Jasaharu; Suwa, Takeshi; Katakai, Ryoichi; Reber, Nicole; Vetter, Johann; Spohr, Reimar (Dep. Mater. Dev., JAERI, Takasaki, 370-12, Japan). JAERI-Review, 97-015, 83-85 (English) **1997**. CODEN: JERVE9.

AB Poly(ethylene terephthalate) film with 19  $\mu\text{m}$  thickness was irradiated with exactly one  $^{197}\text{Au}$  ion with specific energy of 11.6 MeV/u, then etched in 5 M aq. soln. of sodium hydroxide leading to a cylindrical

pore of 2.9  $\mu\text{m}$  diam. and 17.8  $\mu\text{m}$  thickness, and grafted with  $\gamma$ -ray in an aq. soln. of N-isopropylacrylamide at 25° to give a ion-track **membrane** with a thermo-responsive function. The expts. with a mixt. of poly(ethylene glycol) (PEG) and **electrolyte** proved that the responsive pore represented a thermally controllable valve, hermetically closing for org. mols. larger than 2 nm. In the closed state, the gel blocked the pore and a complete exclusion of PEG with mol. wt. >2000 was achieved.

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 37

ST polyethylene terephthalate **graft copolymer membrane pore**; isopropylacrylamide **graft copolymer membrane** thermoresponsive **pore**

IT Electric conductivity

**Membranes**, nonbiological

Pore

(closure characteristics of poly(ethylene terephthalate)-isopropylacrylamide graft copolymer **membrane** with thermo-responsive ion-track pores in various solns.)

IT Polyoxyalkylenes, uses

(closure characteristics of poly(ethylene terephthalate)-isopropylacrylamide graft copolymer **membrane** with thermo-responsive ion-track pores in various solns.)

IT Polymerization

Polymerization

(graft, radiochem.; prepn. and closure characteristics of poly(ethylene terephthalate)-isopropylacrylamide graft copolymer **membrane** with thermo-responsive ion-track pores in various solns.)

IT 107-21-1, Ethylene glycol, uses 111-46-6, Diethylene glycol, uses 7447-40-7, Potassium chloride, uses 25322-68-3, Polyethylene glycol

(closure characteristics of poly(ethylene terephthalate)-isopropylacrylamide graft copolymer **membrane** with thermo-responsive ion-track pores in various solns.)

IT 173107-24-9P, Ethylene glycol-N-isopropylacrylamide-terephthalic acid graft copolymer

(closure characteristics of poly(ethylene terephthalate)-isopropylacrylamide graft copolymer **membrane** with thermo-responsive ion-track pores in various solns.)

L57 ANSWER 17 OF 29 HCA COPYRIGHT 2007 ACS on STN

127:182290 Counterion transport numbers of poly(acrylic acid)-grafted porous ion-exchange **membranes** as detd. from current step measurements. Kontturi, K.; Mafe, S.; Manzanares, J. A.; Sundholm, G.; Vapola, R. (Dep. of Thermodynamics, Fac. of Phys., Univ. of Valencia, Burjasot, E-46100, Spain). Electrochimica Acta, 42(16),

2569-2575 (English) **1997**. CODEN: ELCAAV. ISSN:  
0013-4686. Publisher: Elsevier.

AB The effect of an elec. current on the concn. polarization of the external bathing solns. and the perm-selectivity was studied of porous ion-exchange **membranes** - poly(vinylidene fluoride) **membranes** graft modified with poly(acrylic acid). The exptl. approach is based on the transient behavior of the total elec. potential drop through the **membrane** cell when a current step is imposed from external nonpolarizable electrodes. When this voltage drop is recorded as a function of time, a transition time characteristic of each **membrane** system was obtained. From this time, the counterion transport no. for the salt soln. (KCl-H<sub>2</sub>O) in the **membrane** can be obtained. The theor. modeling is based on the time-dependent Nernst-Planck equations. The transport no., and then the **membrane** perm-selectivity, decreases with the elec. current. The higher the **membrane** grafting ratio and the lower the external salt concn. the larger the perm-selectivity changes.

CC 72-2 (Electrochemistry)

Section cross-reference(s): 65, 66, 76

ST counterion transport number polymer **membrane**; polyacrylic acid grafted porous exchange **membrane**; PVDA polymer **membrane** transport

IT **Electrolytic** polarization

(concn.; counterion transport nos. of acrylic acid-vinylidene fluoride **graft copolymer porous** ion-exchange **membranes** as detd. from current step measurements in KCl soln.)

IT Electrodifffusion

Ion exchange **membranes**

Simulation and Modeling, physicochemical

Transference number

(counterion transport nos. of acrylic acid-vinylidene fluoride **graft copolymer porous** ion-exchange **membranes** as detd. from current step measurements in KCl soln.)

IT 7447-40-7, Potassium chloride, properties 66796-30-3, Nafion 117 109955-89-7

(counterion transport nos. of acrylic acid-vinylidene fluoride **graft copolymer porous** ion-exchange **membranes** as detd. from current step measurements in KCl soln.)

L57 ANSWER 18 OF 29 HCA COPYRIGHT 2007 ACS on STN

125:122516 Effect of clay type on the diffusional properties of a clay-modified electrode. Stein, Jennifer A.; Fitch, Alanah (Oil-Dry Corporation of America, Mt. Vernon Hill, IL, 60061, USA). Clays and Clay Minerals, 44(3), 381-392 (English) **1996**. CODEN:



CLCMAB. ISSN: 0009-8604. Publisher: Clay Minerals Society.

AB The response of 2 swelling clays (SWy-1 and SAz-1), of 1 **non - swelling** clay (KGa-1), and of a series of mixts. of these clays to different **electrolyte** concns. was studied using clay-modified electrode techniques. A non-interacting probe ion,  $\text{Fe}(\text{CN})_6^{3-}$ , was monitored via redn. for its arrival at a Pt electrode coated with thin films of the clay mixts. The 3 clays had different temporal responses and different equil. currents. For SWy-1, the currents were developed over time and were dependent upon the **electrolyte** of the bathing soln., which was consistent with X-ray diffraction literature data for the interlayer dimension. Similar behavior was found for SAz-1, but for KGa-1, currents were instantaneous and were independent of the bathing **electrolyte**. This suggested that **pores** controlling the probe ion transport were between particle or pinhole in nature. When mixts. of clays were examd., KGa-1 caused defects within the mixed clay film structures. The SWy-1 mixt. was not as affected by these disruptions as was the SAz-1 mixt.

CC 60-4 (Waste Treatment and Disposal)

L57 ANSWER 19 OF 29 HCA COPYRIGHT 2007 ACS on STN

124:178178 Transport behavior of **electrolytes** through charged mosaic composite **membranes**. Ishizu, Koji; Iwade, Masaya (Department of Polymer Science, Tokyo Institute of Technology, Tokyo, 152, Japan). Polymer-Plastics Technology and Engineering, 34(6), 891-915 (English) 1995. CODEN: PPTEC7. ISSN: 0360-2559. Publisher: Dekker.

AB For prepn. of charged mosaic composite **membranes**, a template pattern with alternating poly(4-vinylpyridine) (P4VP)/poly(vinyl alc.) (PVA) lamellae was fabricated on a microporous **membrane** by casting 4-vinylpyridine (4VP)-vinyl alc. (VA) graft copolymer from a water/1-propanol mixt. After a treatment involving the binding of the **microporous membrane** with the **graft copolymer** and also domain fixing of the PVA phases, a dil. soln. of sodium p-styrenesulfonate (SSS)-VA graft copolymer/P4VP binary blend was cast on this template surface. After chem. treatments (introduction of a pos. charge and domain fixing of ion-exchange regions), the transport of KCl and selective transport of a KCl-sucrose mixt. through the charged mosaic composite **membrane** was obsd. Other mosaic **membranes** were formed from polyacrylic acid and quaternized P4VP; transport of KCl and L-phenylalanine through these **membranes** was examd.

CC 38-3 (Plastics Fabrication and Uses)

ST **electrolyte** transport polymeric mosaic **membrane**;  
polyvinylpyridine polystyrenesulfonate **membrane**  
**electrolyte** transport; polyacrylic acid polyvinylpyridine  
**membrane** transport

IT **Electrolytes**

(transport of **electrolytes** through charged polymer

- blend mosaic **membranes**)
- IT Electric conductivity and conduction  
(ionic, transport of **electrolytes** through charged polymer blend mosaic **membranes**)
- IT 9003-01-4, Poly(acrylic acid) 25704-18-1, Poly(sodium p-styrenesulfonate)  
(blends with poly(vinylpyridine); transport of **electrolytes** through charged polymer blend mosaic **membranes**)
- IT 25232-41-1, Poly(4-vinylpyridine)  
(blends with polystyrenesulfonate or poly(acrylic acid); transport of **electrolytes** through charged polymer blend mosaic **membranes**)
- IT 63-91-2, L-Phenylalanine, processes 7447-40-7, Potassium chloride, processes  
(**electrolyte**; transport of **electrolytes** through charged polymer blend mosaic **membranes**)
- IT 57-50-1, Sucrose, processes  
(potassium chloride mixts., **electrolyte**; transport of **electrolytes** through charged polymer blend mosaic **membranes**)

L57 ANSWER 20 OF 29 HCA COPYRIGHT 2007 ACS on STN

124:148008 Transport of organic and inorganic solutes through charged mosaic composite **membranes**. Ishizu, Koji; Iwade, Masaya; Kiniwa, Hideaki; Watanabe, Junya (Department of Polymer Science, Tokyo Institute of Technology 2-12, Ookayama, Meguro-ku, Tokyo, 15, Japan). Journal of Membrane Science, 109(1), 35-42 (English) 1996. CODEN: JMESDO. ISSN: 0376-7388. Publisher: Elsevier.

AB A template pattern with alternating poly(4-vinylpyridine) (P4VP)/poly(vinyl alc.) (PVA) lamellae was fabricated upon a microporous poly(vinyl chloride) (PVC) **membrane** by casting of poly[4-vinylpyridine(4VP)-g-vinyl alc. (VA)] graft copolymer. After a treatment of both binding of **microporous membrane** with **graft copolymer** and domain fixing of the PVA matrix, a dil. soln. of poly[acrylic acid (AA)-benzyl N,N-dimethyldithiocarbamate (DMTC)]/P4VP or poly[sodium p-styrenesulfonate (SSS)-DMTC]/P4VP binary blend was cast on this template surface. Two types of weak acid/strong base or strong acid/strong base microdomains formed by phase growth were oriented perpendicularly to the **membrane** surface. After the chem. treatments: introduction of the charge and domain fixing of ion exchange regions, two types of such mosaic microdomains could be constructed on a microporous **membrane**. We studied the transport behaviors of org. and inorg. solutes through charged mosaic composite **membranes**. The permeability of inorg. **electrolyte**, such as KCl was about 20-fold compared to those of org. nonelectrolytes, such

as glucose and sucrose. L-Phenylalanine exhibits a low value of permeability at the pH of its isoelec. point.

CC 38-3 (Plastics Fabrication and Uses)  
Section cross-reference(s): 37

ST photocrosslinked anionic composite **membrane** solute transport; sucrose transport charged mosaic composite **membrane**; glucose transport charged mosaic composite **membrane**; phenylalanine transport charged mosaic composite **membrane**; **electrolyte** transport charged mosaic composite **membrane**; epitaxial phase growth composite **membrane** prepn

IT Permeability and Permeation  
(transport of org. and inorg. solutes through charged mosaic composite **membranes**)

IT **Membranes**  
(semipermeable, asym., mosaic, charged, microporous, composite; transport of org. and inorg. solutes through charged mosaic composite **membranes**)

IT 7447-40-7, Potassium chloride, properties  
(aq. soln.; transport of org. and inorg. solutes through charged mosaic composite **membranes**)

IT 90-94-8, 4,4'-Bis(dimethylamino)benzophenone  
(crosslinking catalyst; transport of org. and inorg. solutes through charged mosaic composite **membranes**)

IT 9002-86-2, Poly(vinyl chloride)  
(**membrane** support; transport of org. and inorg. solutes through charged mosaic composite **membranes**)

IT 110-26-9DP, reaction products with sodium dimethyldithiocarbamate deriv. of p-(Chloromethyl)styrene-sodium p-styrenesulfonate copolymer 2358-84-1DP, Diethylene glycol dimethacrylate, reaction products with sodium dimethyldithiocarbamate deriv. of p-(Chloromethyl)styrene-sodium p-styrenesulfonate copolymer 173854-27-8DP, reaction products with sodium dimethyldithiocarbamate, crosslinked with diethylene glycol dimethacrylate or N,N'-methylenebis(acrylamide)  
(transport of org. and inorg. solutes through charged mosaic composite **membranes**)

IT 128-04-1D, Sodium dimethyldithiocarbamate, reaction products with acrylic acid-p-chloromethylstyrene copolymers or p-chloromethylstyrene-sodium styrenesulfonate copolymers 25232-41-1, Poly(4-vinylpyridine) 109144-67-4D, Vinyl acetate-4-vinylpyridine graft copolymer, hydrolyzed 154154-89-9D, Acrylic acid-p-(chloromethyl)styrene copolymer, reaction products with sodium dimethyldithiocarbamate  
(transport of org. and inorg. solutes through charged mosaic composite **membranes**)

IT 50-99-7, Glucose, properties 57-50-1, properties 63-91-2,

L-Phenylalanine, properties

(transport of org. and inorg. solutes through charged mosaic composite **membranes**)

L57 ANSWER 21 OF 29 HCA COPYRIGHT 2007 ACS on STN

124:57641 Characterization of **Graft-Modified Porous**

**Polymer Membranes**. Hautajarvi, Joni; Kontturi, Kyosti; Nasman, Jan H.; Svarfvar, Bror L.; Viinikka, Pasi; Vuoristo, Mikko (Laboratory of Physical Chemistry and Electrochemistry, Helsinki University of Technology, Espoo, FIN-02150, Finland). Industrial & Engineering Chemistry Research, 35(2), 450-7 (English) 1996. CODEN: IECRED. ISSN: 0888-5885. Publisher: American Chemical Society.

AB Porous poly(vinylidene fluoride) **membranes** were graft modified with acrylic acid by radiation-induced grafting using electron beams. When the grafted **membranes** were characterized by the measurements of convective permeability, diffusion, and ion exchange properties, the **membranes** showed properties of variable permeability **membranes** with respect to the permeability of solvent and the ionic semipermeability. The permeability for the studied **membranes** (extent of grafting 0-93 wt.-%) can be controlled by the ionic strength and pH of the permeate. The more grafted the **membranes** are the greater are the changes in the permeability; e.g., for 85 wt.-% grafting, the permeability increases ca. 4 orders of magnitude when the **electrolyte** concn. is increased from 10 Mm to 1 M. The **membranes** with the extent of grafting of  $\geq 10$  wt.-% appeared to have equal charge d. on the pore walls resulting in the same cation transference no.

CC 37-5 (Plastics Manufacture and Processing)

ST acrylic graft polyvinylidene fluoride **membrane** characterization

IT Diffusion

#### **Membranes**

Permeability and Permeation

(characterization of acrylic acid-graft-modified porous poly(vinylidene fluoride) **membranes**)

IT 109955-89-7P, Acrylic acid-vinylidene fluoride graft copolymer (characterization of acrylic acid-graft-modified porous poly(vinylidene fluoride) **membranes**)

L57 ANSWER 22 OF 29 HCA COPYRIGHT 2007 ACS on STN

116:177726 Chemically stable battery **membrane** of inert

**porous** perfluorinated **polymer** sheet radiation

**grafted** with  $\alpha$ -methylstyrene and adequately

sulfonated. Arnold, Charles, Jr.; Assink, Roger A.; Hollandsworth, Roger P. (United States Dept. of Energy, USA). U. S. Pat. Appl. US 253633 A0 19920101, 14 pp. Avail. NTIS Order No.

PAT-APPL.-7-253 633. (English). CODEN: XAXXAV. APPLICATION: US

1988-253633 19881005.

- AB The title **membrane** from, e.g., PTFE sheet radiation grafted with  $\alpha$ -methylstyrene and sulfonated is used in batteries contg. strong oxidizing **electrolytes**, e.g., in a Zn/[Fe(CN)<sub>6</sub>]<sup>4-</sup> battery. A minor amt. of a divinyl compd. is preferably added to the  $\alpha$ -methylstyrene to crosslink the grafted structure. The  $\alpha$ -methylstyrene-grafted **membrane** was markedly superior to the styrene-grafted **membranes**, and it outperformed the excellent com. Nafion **membranes** in a battery cycling test.
- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38
- IT **Electrolytic** cells  
(separators for, perfluorinated polymer sheets as, sulfonated methylstyrene-radiation grafted)
- IT Dialyzers  
(electro-, **membranes**, perfluorinated polymer sheets as, sulfonated methylstyrene-radiation grafted)
- IT Pervaporation  
(**membranes**, perfluorinated polymer sheets as, sulfonated methylstyrene-radiation grafted)
- IT Fluoropolymers  
(sulfonated, separators from methylstyrene-radiation grafted, stable and oxidn.-resistant, for batteries and **electrolyzers**)
- L57 ANSWER 23 OF 29 HCA COPYRIGHT 2007 ACS on STN  
110:221441 Water **electrolysis** cell. Miyamoto, Takeshi;  
Otsuji, Kaoru; Hanabusa, Osamu; Sawada, Toyoo (Mitsubishi Heavy Industries, Ltd., Japan). Jpn. Kokai Tokkyo Koho JP 01008286 A  
**19890112** Heisei, 4 pp. (Japanese). CODEN: JKXXAF.  
APPLICATION: JP 1987-160859 19870630.
- AB The cell comprises porous anode and cathode on each side of a solid polymer **electrolyte** and a **porous** H<sub>2</sub>O-retaining **material** (e.g., saponified starch-acrylonitrile **graft copolymer**) on the **porous** anode, and the H<sub>2</sub>O is supplied to the cathode chamber. The cell preps. high-purity O and is useful for space travel.
- IC ICM C25B001-04  
ICS C25B011-20
- CC 72-3 (Electrochemistry)  
Section cross-reference(s): 9
- ST water **electrolysis** cell space travel; oxygen prepn water **electrolysis** cell; life support water **electrolysis** cell
- IT **Electrolytic** cells  
(for water **electrolysis**)
- IT Life support systems  
(water-**electrolysis** cells)

- IT 7732-18-5, Water, reactions  
(**electrolysis** of, cells for)
- IT 37291-07-9D, Acrylonitrile-starch copolymer, saponid.  
(graft, water-**electrolysis** cells with anodes coated  
with)
- IT 7782-44-7P, Oxygen, preparation  
(water-**electrolysis** cells for)

L57 ANSWER 24 OF 29 HCA COPYRIGHT 2007 ACS on STN

110:204765 Method for production of an electrode for determining carbon dioxide in a solution and this electrode. Niiyama, Yasusi; Mori, Junji (Hitachi, Ltd., Japan). Ger. Offen. DE 3809624 A1  
**19881013**, 7 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1988-3809624 19880322. PRIORITY: JP 1987-68358 19870323.

AB This electrode, with a high response rate and a high accuracy, is produced by firm and one-piece adhesion of a **nonswelling** spacer with a high **porosity** on the internal side of a CO<sub>2</sub>-permeable **membrane**, attachment of the permeable **membrane** onto the connecting part of the electrode casing, filling an inner **electrolyte** into the electrode casing, and vertical introduction of a pH glass electrode into the **electrolyte**-filled electrode casing, such that the pH glass electrode is firmly in contact with the range spacer. Possible application to blood anal. is indicated.

IC ICM G01N027-30

ICS G01N027-40

ICA G01N033-49; B01D013-04

CC 79-2 (Inorganic Analytical Chemistry)

Section cross-reference(s): 9

IT Polyesters, uses and miscellaneous  
(**membranes**, in electrodes for detn. of carbon dioxide  
in soln.)

L57 ANSWER 25 OF 29 HCA COPYRIGHT 2007 ACS on STN

82:91783 Water-permeable diaphragm for **electrolysis** cell.

Fenn, Robert W., III; Pless, Emory J.; Harris, Richard Lee; O'Leary, Kevin J. (Diamond Shamrock Corp.). Fr. Demande FR 2213805

**19740809**, 13 pp. (French). CODEN: FRXXBL. APPLICATION: FR 1974-1234 19740115.

AB A **nonswelling**, permeable diaphragm covering a **porous** chloralkali cathode is made by suction depositing on the cathode a mixt. of asbestos fibers and particulate or fibrous thermoplastic resin, such as polytetrafluoroethylene (I) [9002-84-0], from an aq. paste which also contains 15% NaCl and 15% NaOH and a surfactant. The deposit is dried at 95° and then heated to a temp. sufficiently high to fuse the polymer and yield an integral, **porous** mass. Thus, a paste contg., I (fibers 6.67 denier, 12.7 mm long) 15 g and octylphenoxypolyethoxyethanol 0.05 g/l. was mixed with asbestos

fibers 15 g. A mesh cathode (2.36 mm steel [12597-69-2] wires calendared to 3.44 mm) was immersed in the paste and subjected to a vacuum of 0-63-5 mm Hg for 5 min., then to about 100 mm for another 10 min. to deposit the diaphragm. It was removed and dried by placing in a vacuum for 30 min. followed by heating at 95° for 1 hr. and then heated to 370° to fuse the polymer. This cathode was used for over 27000 hr with 98% sepn. yield, and an advantage of 240 mV over a cell with a conventional diaphragm not contg. a binder.

IC B01K; C01D

CC 72-10 (Electrochemistry)

ST brine **electrolysis** Teflon diaphragm; cathode brine **electrolysis** steel

IT Asbestos

(diaphragms contg., for brine **electrolysis**)

IT Brines

(**electrolysis** of, asbestos-Teflon deposited diaphragm for)

IT Cathodes

(for brine **electrolysis**, with deposited asbestos-Teflon diaphragm)

IT 12597-69-2, uses and miscellaneous

(cathode, for brine **electrolysis**, with asbestos-Teflon deposited diaphragm)

IT 9002-84-0

(diaphragms contg., for brine **electrolysis**)

L57 ANSWER 26 OF 29 HCA COPYRIGHT 2007 ACS on STN

80:71426 Influence of the characteristics of the activating polyelectrolyte in the preparation and on the properties of interpolymer ion-exchange **membranes**. III. Peculiarities of the functional properties of polyelectrolyte-activated internal swelling **membranes**. Caplan, S. Roy; Sollner, Karl (Natl. Inst. Arthritis, Metab., Dig. Dis., Natl. Inst. Health, Bethesda, MD, USA). Journal of Colloid and Interface Science, 46(1), 77-84 (English) 1974. CODEN: JCISA5. ISSN: 0021-9797.

AB The influence of ionic strength on the spatial distribution of **membrane** charges and of their counterions was discussed by considering a classical **nonswelling membrane** in which the acidic functional dissociable groups were fixed to the matrix walls; a polyelectrolyte-activated internal-swelling **membrane** having a geometrically identical **membrane pore** structure and ion exchange capacity (due to polyelectrolyte loading, which covered the **pore** walls with a monomol. film); and another internal-swelling **membrane** having the same matrix structure but with double the **electrolyte** loading.

CC 36-4 (Plastics Manufacture and Processing)

ST ion exchange **membrane** swelling; polyelectrolyte activated

exchange **membrane**

IT Polyelectrolytes  
 (ion exchange **membranes** activated with, functional properties of)

IT **Membranes**  
 (ion exchanging, polyelectrolytes-activated, functional properties of)

IT Ion exchangers  
 (**membranes**, polyelectrolyte-activated, functional properties of)

IT 9003-01-4  
 (collodion **membranes** impregnated with, functional properties of)

L57 ANSWER 27 OF 29 HCA COPYRIGHT 2007 ACS on STN

39:23309 Original Reference No. 39:3716i,3717a-c The physical chemistry of **membranes** with particular reference to the electrical behavior of **membranes** of **porous** character. II. The nature of the "dried" collodion **membrane**. Some current **membrane** theories and their limitation. Sollner, Karl Journal of Physical Chemistry, 49, 171-91 (Unavailable) 1945 . CODEN: JPCHAX. ISSN: 0022-3654.

AB cf. C.A. 39, 3191.7. "Dried" collodion **membranes** are of a **porous** character and possess a micellar structure. The effect of thickness on concn. potential cannot be interpreted quantitatively on the basis of a theory of non-communicating **pores** or of a theory of completely intercommunicating **pores**. Apparently the true situation is intermediate between these 2 limiting cases. With inorg. **electrolytes** and weakly-adsorbable org. compds., dried collodion **membranes** that have been wet with water behave as rigid **nonswelling** structures. The base-exchange capacity of collodion **membranes** is high for prepn. of great electrochem. activity, but may be medium to low for either active or inactive prepn. The high base-exchange capacities observed are due not so much to higher acid no. as to a more open structure. It is estd. that the ratio of acid groups available for **membrane** functions to total acid groups varies from 1:500 to 1:1,000,000. The selectivity consts. that characterize the electrochem. behavior of **membranes** according to the theories of Teorell (C.A. 29, 3578.6) and Meyer and Sievers (C.A. 30, 6622.5) were detd. by 2 methods. There is an unexpectedly large discrepancy between values obtained from concn. potential measurements and from base-exchange studies.

CC 2 (General and Physical Chemistry)

IT Potential  
 (electric, **membrane** concn.)

IT Bases  
 (exchange of, by **membranes**)



IT Electric properties  
(of collodion **membranes**)

IT **Membranes**  
(phys. chemistry of, and nature of dried collodion)

L57 ANSWER 28 OF 29 HCA COPYRIGHT 2007 ACS on STN

26:27767 Original Reference No. 26:2908g-i Abnormal osmosis at  
**non-swelling membranes**. II. Sollner, K.  
Zeitschrift fuer Elektrochemie und Angewandte Physikalische Chemie,  
36, 234-41 (Unavailable) 1930. CODEN: ZEAPAA. ISSN:  
0372-8323.

AB cf. C. A. 25, 1425. Theoretical. The examn. of systems consisting  
of 2 solns. of an **electrolyte** differing in concn. and communicating  
with each other through 2 **membranes**, the dynamic potentials at which  
are unequal, is extended to include cases in which diffusion  
potentials are present. If the more mobile ion is the one that  
constitutes the mobile part of the double layer in the **pores** of the  
**membrane**, abnormal pos. osmosis, but not abnormal neg. osmosis,  
occurs at the **membrane**. If the mobile part of the double layer  
consists of the less mobile ion, either type of abnormal osmosis may  
take place. When the 2 ions have the same mobility, the only  
possible abnormal osmosis at a **membrane**, either pos. or neg., sepg. 2  
solns. of different concns. is of the pos. type. Abnormal osmosis at  
a single **pore**, even under the influence of the **pore** wall, is possible  
only in the unlikely event that the material of the **membrane** is a  
sufficiently good **electrolytic** conductor. There is no possibility of  
a current circulating in a single **pore** apart from the action of the  
**membrane**, and no motion of liquid can occur within a **pore** without the  
intervention of some external force.

CC 2 (General and Physical Chemistry)

IT Osmosis  
(anomalous, at **nonswelling membranes**)

IT **Membranes**  
(osmosis (abnormal) at **non-swelling**)

IT **Electrolytes**  
(osmosis of, at **non-swelling**  
**membranes**)

L57 ANSWER 29 OF 29 HCA COPYRIGHT 2007 ACS on STN

25:13267 Original Reference No. 25:1425i Abnormal osmosis at  
**non-swelling membranes**. I. Sollner, K.  
Zeitschrift fuer Elektrochemie und Angewandte Physikalische Chemie,  
36, 36-47 (Unavailable) 1930. CODEN: ZEAPAA. ISSN:  
0372-8323.

AB The magnitude of the p. d. between two solns. of **electrolytes** sepd.  
by a collodion **membrane** depends on the previous treatment of the  
collodion, whereby the size of the **pores** is affected. Such **membranes**

contain fine **pores** of widely differing dimensions, thereby causing potentials to be set up which differ from place to place and from **pore** to **pore** and in consequence tend to establish closed-current circuits within and around the **membrane**.

CC 2 (General and Physical Chemistry)

IT Osmosis

(anomalous, at **nonswelling membranes**)

IT Potential, electric

(of **electrolytes**, sepd. by collodion **membrane**

)

IT **Membranes**

(osmosis (abnormal) at **non-swelling**)

=> D L58 1-5 CBIB ABS HITIND

L58 ANSWER 1 OF 5 HCA COPYRIGHT 2007 ACS on STN

134:88674 Modification of Nafion proton exchange membranes to reduce methanol crossover in PEM **fuel cells**. Jia, Nengyou; Lefebvre, Mark C.; Halfyard, John; Qi, Zhigang; Pickup, Peter G. (Department of Chemistry, Memorial University of Newfoundland, St. John's, NF, A1B 3X7, Can.). Electrochemical and Solid-State Letters, 3(12), 529-531 (English) **2000**. CODEN: ESLEF6. ISSN: 1099-0062. Publisher: Electrochemical Society.

AB Com. sulfonated fluorocarbon membranes (Nafion) have been impregnated with poly(1-methylpyrrole) by in situ polymn. This can lead to a decrease of more than 90% in the permeability of the membranes to methanol, although the ionic resistance of such heavily loaded membranes becomes too high for high power **fuel cells**. At lower poly(1-methylpyrrole) loadings, a **decrease in methanol permeability** by as much as 50% can be realized without a significant increase in ionic resistance. Such modified membranes can provide comparable performances to the original membranes in hydrogen **fuel cells**.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST Nafion membrane modification methanol crossover redn **fuel cell**

IT Polyoxyalkylenes, uses

(fluorine- and sulfo-contg., ionomers, **graft** polymers with polypyrroles; modification of Nafion proton exchange membranes to reduce methanol crossover in PEM **fuel cells**)

IT Polymerization

(**graft**; modification of Nafion proton exchange membranes to reduce methanol crossover in PEM **fuel cells**)

- IT Polymers, uses  
(**graft**; modification of Nafion proton exchange membranes to reduce methanol crossover in PEM **fuel cells**)
- IT Permeability  
(modification of Nafion proton exchange membranes to reduce methanol crossover in PEM **fuel cells**)
- IT Fluoropolymers, uses  
(polyoxyalkylene-, sulfo-contg., ionomers, **graft** polymers with polypyrroles; modification of Nafion proton exchange membranes to reduce methanol crossover in PEM **fuel cells**)
- IT Ionomers  
(polyoxyalkylenes, fluorine- and sulfo-contg., **graft** polymers with polypyrroles; modification of Nafion proton exchange membranes to reduce methanol crossover in PEM **fuel cells**)
- IT **Fuel cells**  
(proton-exchange-membrane; modification of Nafion proton exchange membranes to reduce methanol crossover in PEM **fuel cells**)
- IT 72945-66-5D, 1H-Pyrrole, 1-methyl-, homopolymer, **graft** polymers with Nafion  
(modification of Nafion proton exchange membranes to reduce methanol crossover in PEM **fuel cells**)
- IT 67-56-1, Methanol, uses  
(modification of Nafion proton exchange membranes to reduce methanol crossover in PEM **fuel cells**)

L58 ANSWER 2 OF 5 HCA COPYRIGHT 2007 ACS on STN

133:20010 Performance of the direct methanol **fuel cell** with radiation-**grafted** polymer membranes. Scott, K.; Taama, W. M.; Argyropoulos, P. (Chemical and Process Engineering Department, University of Newcastle upon Tyne, Newcastle upon Tyne, UK). Journal of Membrane Science, 171(1), 119-130 (English) **2000**. CODEN: JMESDO. ISSN: 0376-7388. Publisher: Elsevier Science B.V..

AB This paper reports performance data for the direct methanol **fuel cell** (DMFC) using membrane electrode assemblies using radiation-**grafted** proton exchange membranes based on polyethylene and ETFE. These membranes exhibited **low methanol diffusion** coeffs. and were thus felt to be potentially useful in reducing possible methanol cross-over from anode to cathode. The membrane electrode assemblies were based on Nafion-bonded carbon-supported catalyst; platinum/ruthenium for the anode and platinum for the cathode. The cell voltage performance of the DMFC, for short duration (<100 h) testing, with these low cost membranes is as good as, or superior to, that of cells based on

Nafion under identical operating conditions. However, the stability of contact between the membrane and the catalyst layer requires improvement before these membranes become real alternatives to materials such as Nafion, for the DMFC.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST methanol **fuel cell** radiation **grafted**  
polymer membrane

IT Catalysts  
(electrocatalysts; performance of direct methanol **fuel cell** with radiation-**grafted** polymer membranes)

IT Polyoxyalkylenes, uses  
(fluorine- and sulfo-contg., ionomers; performance of direct methanol **fuel cell** with radiation-**grafted** polymer membranes)

IT Polyoxyalkylenes, uses  
(fluorine-contg., sulfo-contg., ionomers; performance of direct methanol **fuel cell** with radiation-**grafted** polymer membranes)

IT **Fuel cells**  
Membranes, nonbiological  
Permeation

(performance of direct methanol **fuel cell** with radiation-**grafted** polymer membranes)

IT Fluoropolymers, uses  
(performance of direct methanol **fuel cell** with radiation-**grafted** polymer membranes)

IT Fluoropolymers, uses  
Fluoropolymers, uses  
(polyoxyalkylene-, sulfo-contg., ionomers; performance of direct methanol **fuel cell** with radiation-**grafted** polymer membranes)

IT Ionomers  
(polyoxyalkylenes, fluorine- and sulfo-contg.; performance of direct methanol **fuel cell** with radiation-**grafted** polymer membranes)

IT 7440-06-4, Platinum, uses 7440-18-8, Ruthenium, uses  
(performance of direct methanol **fuel cell** with radiation-**grafted** polymer membranes)

IT 9002-84-0, Ptfе 9002-88-4, Ldpe 24937-79-9, Pvdф 25038-71-5,  
Teflon etfe 25038-71-5D, sulfonated  
(performance of direct methanol **fuel cell** with radiation-**grafted** polymer membranes)

IT 66796-30-3, Nafion 117  
(performance of direct methanol **fuel cell** with radiation-**grafted** polymer membranes)

IT 67-56-1, Methanol, uses

(performance of direct methanol **fuel cell**  
with radiation-**grafted** polymer membranes)

L58 ANSWER 3 OF 5 HCA COPYRIGHT 2007 ACS on STN

131:75101 Equilibrium and transport properties of polydisperse  
polyelectrolytes in **graft-modified porous**  
charged **membranes**: forced permeation-diffusion of  
lignosulfonate. Kontturi, Anna-Kaisa; Kontturi, Kyosti; Manzanares,  
Jose A.; Mafe, Salvador (Laboratory of Physical Chemistry and  
Electrochemistry, Helsinki University of Technology, FIN-02015,  
Finland). Physical Chemistry Chemical Physics, 1(8), 1939-1945  
(English) **1999**. CODEN: PPCPFQ. ISSN: 1463-9076.

Publisher: Royal Society of Chemistry.

AB The convective diffusion of a polydisperse polyelectrolyte, i.e., a  
lignosulfonate (I), through charged porous **membranes** was studied.  
The **membranes** were characterized by potentiometric transport no.  
detn., both in the presence and in the absence of I. The convective  
diffusion expts. were carried out with NaCl and HCl as supporting  
**electrolytes**. The effect of using different concns. of supporting  
**electrolyte** in the 2 cell compartments was also studied. The Donnan  
equil. and steady-state transport of I in a convective diffusion cell  
are theor. described, and the effects of changing the supporting  
**electrolyte** (and pH) are discussed. Good agreement was obtained  
between theor. and exptl. results. It was shown that the effective  
**membrane** fixed charge reverses its sign because of I adsorption.

CC 43-5 (Cellulose, Lignin, Paper, and Other Wood Products)

ST lignosulfonate forced permeation diffusion **grafted**  
**porous** charged **membrane**; **electrolyte**  
effect polyelectrolyte diffusion **grafted porous**  
charged **membrane**

IT **Membranes**, nonbiological  
(charged; **electrolyte** effect on lignosulfonate forced  
perforation-diffusion in **grafted porous**  
charged **membranes**)

IT Diffusion  
(convective; **electrolyte** effect on lignosulfonate  
forced perforation-diffusion in **grafted porous**  
charged **membranes**)

IT Donnan equilibrium

Electric charge

**Electrolytes**

Permeation

(**electrolyte** effect on lignosulfonate forced  
perforation-diffusion in **grafted porous**  
charged **membranes**)

IT Polymerization

(graft; **electrolyte** effect on lignosulfonate forced

- perforation-diffusion in **grafted porous charged membranes**)
- IT Polyelectrolytes  
(polydisperse; **electrolyte** effect on lignosulfonate forced perforation-diffusion in **grafted porous charged membranes**)
- IT 7647-01-0, Hydrochloric acid, uses 7647-14-5, Sodium chloride, uses  
(**electrolyte** effect on lignosulfonate forced perforation-diffusion in **grafted porous charged membranes**)
- IT 8062-15-5D, Lignosulfonic acid, salts  
(**electrolyte** effect on lignosulfonate forced perforation-diffusion in **grafted porous charged membranes**)
- L58 ANSWER 4 OF 5 HCA COPYRIGHT 2007 ACS on STN
- 107:243453 Mobility and self-diffusion coefficient of sulfate co-ion in a grafted cation-exchange **membrane**. Chakravarti, A. K.  
(Dep. Pure Chem., Univ. Coll. Sci. Technol., Calcutta, India).  
Journal of Membrane Science, 32(2-3), 175-84 (English) **1987**  
. CODEN: JMESDO. ISSN: 0376-7388.
- AB Donan concn., concn. in the pore liq., self-diffusion coeff. and mobility of the sulfate co-ion in sulfonated polystyrene grafted onto a polyethylene **membrane** as back-bone were detd. by using 0.001-0.50 M MgSO<sub>4</sub> as external **electrolyte**. In the dil. soln. region, the Donnan exclusion is also obsd. when calcd. in terms of concns. rather than activities. The values of the above-mentioned parameters for the sulfate co-ion in the **membrane** are smaller than those for halide and sulfate co-ions in so-called homogeneous **membranes**. Higher co-ion charge, and the heterogeneous nature and low water content of the present **membrane**, are thought to be the reasons for the obsd. smaller values. The values of the parameters increase with increasing temp. for a particular soln. concn.
- CC 66-4 (Surface Chemistry and Colloids)  
Section cross-reference(s): 65
- ST sulfate coion diffusion grafted cationite **membrane**; pore **membrane** concn sulfate ion; sulfonated polymer **membrane** pore sulfate diffusion; cationite **membrane** grafted sulfonated polystyrene
- IT Cation exchangers  
(**membranes**, sulfonated polystyrene grafted, mobility and self-diffusion coeff. of sulfate ions in)
- IT Diffusion  
(self-, of sulfate co-ion in grafted cation exchange **membrane**)
- IT 106826-12-4D, sulfonated

(as cation exchange **membrane**, mobility and cell diffusion coeff. of sulfate ion in pores of)

IT 14808-79-8, Sulfate ion, properties  
(diffusion of, from magnesium sulfate solns. into **pores** of **grafted** cation-exchanger **membrane**)

L58 ANSWER 5 OF 5 HCA COPYRIGHT 2007 ACS on STN  
102:206590 Research on separators for alkaline zinc batteries. Final report. Yeo, R. S. (Pinnacle Res. Inst., Cupertino, CA, USA). Report, LBL-18574; Order No. DE85003082, 32 pp. Avail. NTIS From: Energy Res. Abstr. 1985, 10(5), Abstr. No. 8666 (English) **1984.**

AB The research and development of an improved, hybrid separator are reported. The mitigation of the failure of Zn anodes by controlling the permselectivity of the separator was emphasized. Hybrid separators were synthesized and fabricated. These separators consist of a **microporous** film, radiation-**grafted** with a monomer contg. ion-exchange groups. The new separator incorporates the favorable aspects of both ion-exchange **membranes** and microporous separators. Such a hybrid separator should ideally be highly specific for fast transport of **electrolyte** while inhibiting zincate diffusion. Hybrid separators with a wide range of percent graft ( $\leq 60\%$ ) were made by varying the monomer concn. and radiation time. The grafting of these ionic groups imparts the ion selectivity of the separators. The **electrolyte** uptake of hybrid separators is .apprx.60 wt.%. The higher the percent graft of the separator, the higher the water uptake and the lower the KOH uptake that are obsd. The permeabilities of zincate ions were measured for a series of hybrid separators.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

=> D HIS L59-

FILE 'HCA'

L59	12994 S (L18 OR LOW OR LOWER? OR DIMINISH? OR LESS? OR DECREAS?
L60	515 S L59 AND (L1 OR L2)
L61	11 S L60 AND L44
L62	138 S L60 AND L3
L63	18 S L60 AND L5
L64	48 S L60 AND L6
L65	56 S L60 AND L7
L66	14 S L60 AND L8
L67	44 S L62 AND L64
L68	22 S L62 AND L65
L69	12 S L64 AND L65

L70 11 S L67 AND L68  
 L71 41 S (L61 OR L63 OR L66 OR L68 OR L69 OR L70) NOT (L56 OR L5  
 L72 15 S 1840-2000/PY, PRY AND L71

=> D L72 1-15 CBIB ABS HITIND

L72 ANSWER 1 OF 15 HCA COPYRIGHT 2007 ACS on STN

131:88816 Ultrahigh-molecular-weight polyethylene **membranes** with high **porosity**, excellent strength, and reduced electric resistance and their manufacture. Uetani, Yoshihiro; Higuchi, Hiroyuki; Tojo, Yasuhisa (Nitto Denko Corp., Japan). Jpn. Kokai Tokkyo Koho JP 11181134 A **19990706** Heisei, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1997-348809 19971218.

AB The **membranes**, useful for nonaq. **electrolyte** battery separators, are based on UHMWPE with viscosity-av. mol. wt. (Mv)  $\geq 1 + 10^6$  and have **porosity** 15-75%, needle penetration strength  $\geq 0.25$  N/ $\mu$ m, and elec. resistance (Rt) in an **electrolyte** soln. of  $\leq 100$  m $\Omega$ -cm<sup>2</sup>/ $\mu$ m [Rt = (R1 - R0)S/t; R1 = elec. resistance m $\Omega$  of the **membrane** with area S cm<sup>2</sup> and thickness t  $\mu$ m in the thickness direction measured in the **electrolyte** soln.; R0 = elec. resistance of the **electrolyte** soln. without the **membrane**]. A film based on UHMWPE with Mv  $\geq 1 + 10^6$  is stretched in at least one direction contacting to a solvent which can swell polyethylene, further contacted to another solvent in which polyethylene **swells less** than in the former solvent, and freed of the solvents to give the **porous membrane**. Thus, an extruded Hi-zex Million 240M (Mv  $3.5 + 10^6$ ) film was immersed in xylene for 1 min, stretched 100% uniaxially, further immersed in EtOH for 60 s, dried, and heat-set to give a **membrane** showing **porosity** 35%, Rt 66 m $\Omega$ -cm<sup>2</sup>/ $\mu$ m, and needle penetration strength 0.28 N/ $\mu$ m.

IC ICM C08J009-00  
 ICS B29C055-02; H01M002-16; B29K023-00; B29K105-04; B29L007-00

CC 38-3 (Plastics Fabrication and Uses)  
 Section cross-reference(s): 52

ST UHMWPE **membrane** manuf solvent swelling; battery separator  
 UHMWPE **membrane** penetration resistance

IT **Membranes**, nonbiological  
 Primary battery separators  
 Secondary battery separators

(manuf. of UHMWPE **membranes** with high **porosity**, reduced elec. resistance, and good penetration resistance)

IT 9002-88-4, Hi-zex Million 240M  
 (manuf. of UHMWPE **membranes** with high **porosity**, reduced elec. resistance, and good penetration resistance)

IT 100-42-5, uses 108-88-3, Toluene, uses 1330-20-7, Xylene, uses



(solvent, swelling by; manuf. of UHMWPE **membranes** with high **porosity**, reduced elec. resistance, and good penetration resistance)

IT 64-17-5, Ethanol, uses

(swelling solvent substitution by; manuf. of UHMWPE **membranes** with high **porosity**, reduced elec. resistance, and good penetration resistance)

L72 ANSWER 2 OF 15 HCA COPYRIGHT 2007 ACS on STN

129:246189 Influence of crosslinkers on the water-swelling properties of radiation-**grafted** ion-exchange membranes. Brack, Hans-Peter; Scherer, Gunther G. (Electrochem., Paul Scherrer Inst., Villigen, CH-5232, Switz.). Polymeric Materials Science and Engineering, 79, 457-458 (English) **1998**. CODEN: PMSE DG. ISSN: 0743-0515. Publisher: American Chemical Society.

AB The water swelling properties of ion-exchange membranes are important in their application in aq. environments. We are prepg. ion-exchange membranes for **fuel cell** applications from base fluoropolymer (FEP 200A) films by radiation **grafting** them with styrene and crosslinkers and subsequently sulfonation of the **graft** component. The effect of some preparative parameters on the water swelling properties of these membranes will be reported. For example, swelling can be controlled through crosslinking. Vibrational spectroscopy has been used to investigate the incorporation of two crosslinkers, divinylbenzene (DVB) and triallyl cyanurate (TAC), and their extent of reaction. DVB is readily incorporated during **grafting** and reduces the extent of **grafting** and water swelling in comparison to uncrosslinked systems. In contrast, TAC is not readily incorporated during **grafting**. Interestingly, TAC increases the **grafting** level and does not **reduce** the water **swelling** in comparison to uncrosslinked systems. The influence of other preparative parameters on swelling will also be discussed.

CC 38-3 (Plastics Fabrication and Uses)

Section cross-reference(s): 35

ST radiation **grafted** ion exchange membrane; crosslinker fluoropolymer ion exchange membrane

IT Crosslinking agents

(divinylbenzene or triallyl cyanurate; effect of crosslinkers on water-swelling properties of radiation-**grafted** ion-exchange membranes)

IT Ion exchange membranes

(effect of crosslinkers on water-swelling properties of radiation-**grafted** ion-exchange membranes)

IT Polycyanurates

Polycyanurates

(fluorine-contg., sulfo-contg.; effect of crosslinkers on water-swelling properties of radiation-**grafted**

- ion-exchange membranes)
- IT Ionomers  
(fluoropolymers, sulfo-contg.; effect of crosslinkers on water-swelling properties of radiation-**grafted** ion-exchange membranes)
- IT **Polymerization**  
(**graft**; effect of crosslinkers on water-swelling properties of radiation-**grafted** ion-exchange membranes)
- IT Fluoropolymers, uses  
(ionomers, sulfo-contg.; effect of crosslinkers on water-swelling properties of radiation-**grafted** ion-exchange membranes)
- IT Fluoropolymers, uses  
Fluoropolymers, uses  
(polycyanurate-, sulfo-contg.; effect of crosslinkers on water-swelling properties of radiation-**grafted** ion-exchange membranes)
- IT 101-37-1, Triallylcyanurate 1321-74-0, Divinylbenzene, uses  
(crosslinker; effect of crosslinkers on water-swelling properties of radiation-**grafted** ion-exchange membranes)
- IT 125649-63-0D, Divinylbenzene-Hexafluoropropene-styrene-tetrafluoroethene **graft copolymer**, sulfonated  
(effect of crosslinkers on water-swelling properties of radiation-**grafted** ion-exchange membranes)
- IT 156395-37-8  
(sulfonated; effect of crosslinkers on water-swelling properties of radiation-**grafted** ion-exchange membranes)

L72 ANSWER 3 OF 15 HCA COPYRIGHT 2007 ACS on STN

- 123:233292 Performance of differently cross-linked, partially fluorinated proton exchange membranes in polymer **electrolyte fuel cells**. Buechi, Felix N.; Gupta, Bhuvanesh; Haas, Otto; Scherer, Guenther G. (Laboratory for Energy and Process Technology, Paul Scherrer Inst., Villigen-PSI, CH-5232, Switz.). Journal of the Electrochemical Society, 142(9), 3044-8 (English) **1995**. CODEN: JESOAN. ISSN: 0013-4651. Publisher: Electrochemical Society.
- AB A series of differently cross-linked FEP-g-polystyrene proton exchange membranes has been synthesized by the preirradn. **grafting** method [FEP: poly(tetrafluoroethylene-co- hexafluoropropylene)]. Divinylbenzene (DVB) and/or triallyl cyanurate (TAC) were used as cross-linkers in the membranes. It was found that the phys. properties of the membranes, such as water-uptake and specific resistance, are strongly influenced by the nature of the crosslinker. Generally it can be stated that DVB decreases water-uptake and increases specific resistance; on the other hand TAC increases **swelling** and **decreases** specific resistance to values as low as 5.0  $\Omega$  cm at 60°. The membranes were tested in H<sub>2</sub>/O<sub>2</sub> **fuel cells** for

stability and performance. It was found that thick (170  $\mu\text{m}$ ) DVB crosslinked membranes showed stable operation for 1400 h at temps. up to 80°. The highest power d. in the **fuel cell** was found for the DVB and TAC double-cross-linked membrane; it exceeded the value of a cell with a Nafion 117 membrane by more than 60%.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST fluorinated proton exchange membrane **fuel cell**;  
polymer **electrolyte fuel cell**

IT **Fuel-cell electrolytes**

(performance of differently cross-linked, partially fluorinated proton exchange membranes in polymer **electrolyte fuel cells**)

IT 101-37-1, Triallyl cyanurate 1321-74-0, Divinylbenzene, uses  
(cross-linker; performance of differently cross-linked, partially fluorinated proton exchange membranes in polymer **electrolyte fuel cells**)

IT 125649-63-0D, sulfonated  
(performance of differently cross-linked, partially fluorinated proton exchange membranes in polymer **electrolyte fuel cells**)

L72 ANSWER 4 OF 15 HCA . COPYRIGHT 2007 ACS on STN

122:269993 Study of radiation-**grafted** FEP-g-polystyrene membranes as polymer **electrolytes** in **fuel**

**cells**. Buchi, Felix N.; Gupta, Bhuvanesh; Haas, Otto; Scherer, Gunther G. (Paul Scherrer Inst., Villigen PSI, CH-5232, Switz.). Electrochimica Acta, 40(3), 345-53 (English) **1995**. CODEN: ELCAAV. ISSN: 0013-4686. Publisher: Elsevier.

AB Proton exchange membranes for **fuel cell** applications were synthesized by pre-irradn. **grafting** of styrene/divinylbenzene mixts. into poly(fluoroethylene-co- hexafluoropropylene) films and subsequent sulfonation. **Grafting** of pre-existing films overcomes the problem of shaping the **grafted polymer** into thin membranes and makes this process a potentially cheap and easy technique for the prepn. of solid polymer **electrolytes**. The **grafted** membranes were characterized by measuring their ion exchange capacity, **swelling**, specific **resistivity** and area resistance. Due to their thickness in the range 67-211  $\mu\text{m}$ , some of the membranes have a considerably lower resistance than the most widely used membrane Nafion 117. The short-term and long-term performance of these membranes was investigated in H/O **fuel cells**. Thin (<100  $\mu\text{m}$ ), highly crosslinked (12% divinylbenzene) membranes show the best performance in the **fuel cells**. Tests for periods of  $\leq 1400$  h were performed to examine membrane stability and the degrdn. of **grafted** membranes.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

- ST fluoroethylene hexafluoropropylene **polymer** radiation  
**grafted** membrane; styrene radiation **grafted**  
fluoropolymer membrane; vinylbenzene radiation **grafted**  
fluoropolymer membrane; **fuel cell** separator  
radiation **grafted** fluoropolymer
- IT **Fuel cells**  
(hydrogen/oxygen; performance of **fuel cells**  
with membranes of fluoroethylene-hexafluoropropylene  
**polymer** radiation-**grafted** with styrene and  
divinylbenzene and subsequently sulfonated)
- IT Fluoropolymers  
(membranes; prepn. of membranes of fluoroethylene-  
hexafluoropropylene **polymer** radiation-**grafted**  
with styrene and divinylbenzene and subsequently sulfonated as  
polymer **electrolytes** in **fuel cells**)
- IT Electric resistance  
(of membranes of fluoroethylene-hexafluoropropylene  
**polymer** radiation-**grafted** with styrene and  
divinylbenzene and subsequently sulfonated)
- IT **Fuel cells**  
(separators, proton exchange; prepn. of membranes of  
fluoroethylene-hexafluoropropylene **polymer** radiation-  
**grafted** with styrene and divinylbenzene and subsequently  
sulfonated as polymer **electrolytes** in **fuel**  
**cells**)
- IT 25067-11-2D, Tetrafluoroethylene-hexafluoropropylene  
**copolymer**, radiation-**grafted** with styrene and  
divinylbenzene, sulfonated  
(crosslinked; prepn. of membranes of fluoroethylene-  
hexafluoropropylene **polymer** radiation-**grafted**  
with styrene and divinylbenzene and subsequently sulfonated as  
polymer **electrolytes** in **fuel cells**)
- IT 100-42-5D, Styrene, fluoroethylene-hexafluoropropylene  
**polymer** radiation-**grafted** with 1321-74-0D,  
Divinylbenzene, fluoroethylene-hexafluoropropylene **polymer**  
radiation-**grafted** with  
(prepn. of membranes of fluoroethylene-hexafluoropropylene  
**polymer** radiation-**grafted** with styrene and  
divinylbenzene and subsequently sulfonated as polymer  
**electrolytes** in **fuel cells**)

L72 ANSWER 5 OF 15 HCA COPYRIGHT 2007 ACS on STN

122:218507 A new class of partially fluorinated **fuel-**  
**cell** membranes. Muchi, Felix N.; Gupta, Bhuvanesh; Halim,  
John; Haas, Otto; Scherer, Gunther G. (Paul Scherrer Inst.,  
Villigen, CH-5232, Switz.). Proceedings - Electrochemical Society,  
94-23(Electrode Materials and Processes for Energy Conversion and

Storage), 220-35 (English) **1994**. CODEN: PESODO. ISSN:  
0161-6374. Publisher: Electrochemical Society.

AB Differently crosslinked styrene-**grafted** FEP proton-exchange membranes were synthesized by the preirradn. **grafting** method. Divinylbenzene (DVB) and/or triallyl cyanurate (TAC) were used as crosslinkers in the membranes. The phys. properties of the membranes, such as H<sub>2</sub>O-uptake and sp. resistance are strongly influenced by the nature of the crosslinker. Generally it can be stated, that DVB decreases H<sub>2</sub>O-uptake and increases sp. resistance, however, TAC increases **swelling** and **decreases** sp. resistance to  $\geq 5.0 \Omega\text{-cm}$  at 60°. The membranes were tested in H<sub>2</sub>/O<sub>2</sub> **fuel cells** for stability and performance. Thick (170  $\mu\text{m}$ ) DVB-crosslinked membranes showed stable operation for 1400 h at  $\leq 80^\circ$ . The highest power d. in the **fuel cell** was found for the DVB and TAC double crosslinked membrane, it exceeded the value of a cell with a Nafion 117 membrane by >60%.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST **fuel cell** membrane partly fluorinated; styrene  
copolymer **fuel cell** membrane; FEP copolymer  
**fuel cell** membrane; divinylbenzene copolymer  
**fuel cell** membrane; triallyl cyanurate copolymer  
**fuel cell** membrane

IT **Fuel cells**

(separators, partly fluorinated proton-exchange membranes for)

IT 125649-63-0P 156395-37-8P 162113-36-2P  
(proton-exchange **fuel-cell** membranes)

L72 ANSWER 6 OF 15 HCA COPYRIGHT 2007 ACS on STN

121:183674 Hydrogen **fuel cell** with layered  
electrode. Dodge, Cleveland E., Jr. (USA). U.S. US 5336570 A  
**19940809**, 23 pp. Cont.-in-part of U.S. Ser. No. 929,706  
abandoned. (English). CODEN: USXXAM. APPLICATION: US 1993-15411  
19930209. PRIORITY: US 1992-929706 19920821.

AB The **fuel cell** **resists swelling** of a proton-exchange **membrane**  
**electrolyte** by clamping the **membrane** between 2 catalytic electrodes in  
a tubular or frustoconical configuration. Improved breathability and  
H sealing are obtained. The electrodes can be bonded to the solid  
**electrolyte** by employing an **electrolytic proton-transporting** polymer  
in the liq.-phase. Including finely divided Pt in the liq. phase  
provides an advantageous means of incorporating catalyst in the cell.  
A blind tube **porous** carbon electrode assembly is used which can be  
manufd. by coating a self-supporting electrode with a liq.-phase  
polymeric **electrolyte** material, e.g., perfluorosulfonic acid, and  
curing it.

IC ICM H01M008-10

INCL 429031000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST hydrogen **fuel cell** layered electrode  
 IT **Fuel cells**  
     (hydrogen **fuel cell** with layered electrode)  
 IT Polyoxyalkylenes, uses  
     (fluorine- and sulfo-contg., ionomers, hydrogen **fuel cell** with layered electrode)  
 IT Fluoropolymers  
     (polyoxyalkylene-, sulfo-contg., ionomers, hydrogen **fuel cell** with layered electrode)  
 IT 7440-06-4, Platinum, uses  
     (catalyst; hydrogen **fuel cell** with layered electrode)  
 IT 1333-74-0, Hydrogen, uses 7782-44-7, Oxygen, uses  
     (hydrogen **fuel cell** with layered electrode)

L72 ANSWER 7 OF 15 HCA COPYRIGHT 2007 ACS on STN

121:60883 Swelling of shale around a cylindrical wellbore. Sherwood, J. D.; Bailey, L. (Schlumberger Cambridge Res., Cambridge, CB3 0HG, UK). Proceedings of the Royal Society of London, Series A: Mathematical, Physical and Engineering Sciences, 444(1920), 161-84 (English) **1994**. CODEN: PRLAAZ. ISSN: 0080-4630.

AB A modified form of Biot's linear theory of **poroelasticity** is applied to shale swelling in contact with an aq. **electrolyte**. The shale is assumed to behave as an isotropic, perfect ion exclusion **membrane**, and in this limit swelling depends only upon the total stress and on the chem. potential of water within the **pores** of the rock. An axisym., plane-strain anal. of swelling around a wellbore is first presented, and this is subsequently extended to include swelling of a cylindrical hole in a finite, cylindrical shale sample. It is predicted that **swelling** is **prevented** if the chem. potential of water within the shale equals that within the wellbore. The predictions of the anal. are compared with exptl. results obtained when drained outcrop shale swelled in contact with aq. solns. of KCl or NaCl. The exptl. swelling did indeed vary with water chem. potential, and could be prevented if the salt concn. within the wellbore fluid was sufficiently high. However, post-mortem chem. anal. of the shale showed that ion-exchange had taken place, with consequent modification of the shale's mech. and chem. properties. Ion exclusion was therefore imperfect, and an anal. that incorporates the chem. potentials of components other than water is necessary.

CC 51-2 (Fossil Fuels, Derivatives, and Related Products)

L72 ANSWER 8 OF 15 HCA COPYRIGHT 2007 ACS on STN

106:120910 Synthesis of perfluorinated ionomer membranes for electrochemical cells. Lee, J.; D'Agostino, V.; Fried, R.; Diebold, E. (RAI Res. Corp., Hauppauge, NY, 11788, USA). Proceedings - Electrochemical Society, 86-13(Diaphragms, Sep., Ion-Exch. Membr.),

102-19 (English) 1986. CODEN: PESODO. ISSN: 0161-6374.

- AB Me perfluorobuten-3-oate (I) [20562-79-2] was prep'd. and used for radiation **grafting** to yield perfluorinated ionomer membranes. Membranes prep'd. by **grafting** of I with polyethylene showed **less swelling** in alcs. and emulsified solns. than Nafion. **Grafting** of I onto fluorocarbon substrates was less successful. **Grafting** of proprietary perfluorocarboxylic acid monomer showed more promise onto both polyethylene and fluorocarbon substrates. This ionomer membranes, esp. the perfluorinated substrates, were stable in an oxidative environment at elevated temp. and had good permselectivity and elec. resistance.
- CC 38-3 (Plastics Fabrication and Uses)  
Section cross-reference(s): 72
- ST perfluorinated ionomer membrane electrochem cell; Me perfluorobutenoate **graft** ionomer membrane; polyethylene perfluorinated ionomer membrane; fluoropolymer ionomer membrane; permselectivity perfluorinated ionomer membrane; elec resistance perfluorinated ionomer membrane
- IT **Electrolytic** cells  
(membranes, perfluorinated ionomers)
- IT Alkenes, polymers  
(polymers with ethylene and Me perfluorobutenoate, **graft**, membranes, prepn. and characterization of)
- IT 74-85-1DP, Ethylene, polymers with Me perfluorobutenoate and olefins, **graft** 116-14-3DP, polymers with Me perfluorobutenoate and perfluoroalkoxy derivs., **graft** 1480-82-6DP, polymers with ethylene and olefins, **graft** 107221-36-3P 107221-37-4P 107241-11-2P 107241-12-3P 107241-13-4P 107320-88-7P  
(membranes, prepn. and characterization of)
- IT 20562-79-2P  
(prepn. and **grafting** of)

L72 ANSWER 9 OF 15 HCA COPYRIGHT 2007 ACS on STN

86:91539 Study of the stability of cellulose ion exchange fibers. Chebotareva, R. D.; Mel'nik, T. S.; Grebenyuk, V. D.; Nosov, M. P. (Inst. Kolloidn. Khim. Khim. Vody, Kiev, USSR). Ukrainskii Khimicheskii Zhurnal (Russian Edition), 42(12), 1267-72 (Russian) 1976. CODEN: UKZHAU. ISSN: 0041-6045.

AB Rayon and vinyl comp'd.-modified rayon change their physicochem. properties and orientation indicators on exposure to **electrolyte** solns. The nature of the **electrolytes** and the contact time of rayon-contg. ion exchangers with the **electrolytes** had a less significant effect on properties of fibers than the swelling and drying cycles. Storage of fibers in 0.1N acid and alk. solns. did not change the swelling degree of rayon and anion exchanger TsMA 2 (cellulose-methylvinylpyridine **graft copolymer** reaction products with

epichlorohydrin) [39290-60-3]. A 10 and 5% **decrease** in **swelling** of cation exchanger (TSMK 4 (cellulose-methacrylic acid **graft copolymer**) [61811-66-3] was obsd. in acid and alk. solns., resp.

CC 39-3 (Textiles)

ST ion exchanger modified rayon; vinyl **grafted** cellulose

IT Anion exchangers  
Cation exchangers  
(rayon **graft copolymers** with vinyl compds.,  
stability of, in **electrolyte** solns.)

IT Rayon, compounds  
(vinyl-**grafted**, ion exchange properties of)

IT 39290-60-3 61811-64-1  
(anion exchangers, stability of, in **electrolyte** solns.)

IT 37218-14-7 61811-66-3  
(cation exchangers, stability of, in aq. **electrolyte**  
solns.)

IT 61811-65-2  
(cation exchangers, stability of, in **electrolyte**  
solns.)

IT 25638-00-0D, **polymer** with rayon  
(**graft**, anion exchanger)

IT 106-89-8D, reaction products with methylvinylpyridine-rayon  
**polymer**  
(**graft**, anion exchangers)

IT 79-41-4D, **polymer** with rayon  
(**graft**, cation exchanger)

L72 ANSWER 10 OF 15 HCA COPYRIGHT 2007 ACS on STN

72:108361 Moniliformis dubius: osmotic responses. Branch, S. I. (Dep. Zool., Aust. Nat. Univ., Canberra, Australia). Experimental Parasitology, 27(1), 44-52 (English) **1970**. CODEN: EXPAAA. ISSN: 0014-4894.

AB M.dubius swells in hyperosmotic NaCl and KCl if it is metabolically active. Temp. inactivation of metabolism **prevents swelling**. The anion accompanying Na and K ions can also **prevent swelling** if it is larger than the size of the hydrated **pores** in the plasma **membrane**. Large mols., e.g., sucrose, cause the worm to behave as an osmometer, there being no evidence of internal hydrostatic pressure. The data indicate the existence of Na and K ion transport pumps in the tegument of Moniliformis dubius.

CC 9 (Nonmammalian Biochemistry)

ST Moniliformis transport **electrolytes**; transport  
Moniliformis **electrolytes**; **electrolytes**  
Moniliformis transport

IT **Electrolytes**, biological studies  
(metabolism of, by Moniliformis dubius)



L72 ANSWER 11 OF 15 HCA COPYRIGHT 2007 ACS on STN

70:48504 Modification of viscose fibers by electrochemical **grafting** of vinyl acetate. Skwarski, Tadeusz; Mikolajczyk, Teresa; Krasinska, Anna (Politech. Lodzkiej, Lodz, Pol.). Polimery (Warsaw, Poland), 13(7), 301-4 (Polish) 1968. CODEN: POLIA4. ISSN: 0032-2725.

AB The app. and procedure used for the electrochem. **grafting** were described in 1966 by T. Skwarski. The **electrolytic** soln. consisted of 5 ml. vinyl acetate added to 150 ml. 0.5N H<sub>2</sub>SO<sub>4</sub> soln. **Grafting** was carried out in the presence of air or in N. The effect of c.d. and time on the wt. increase ( $\Delta W$ ) of silk rayon (I) fibers was studied. **Grafting** in N atm. gave higher  $\Delta W$ . Replacement of Pt-Hg electrodes with Pt-Pb electrodes increased  $\Delta W$  and reduced the formation of poly(vinyl acetate) to practically nothing. **Grafted I** had only slightly reduced tensile strength, but it had increased heat stability (no loss of wt. after 5 hrs. at 150°), **decreased swelling** in water, and moisture absorption. The optimum **grafting** ( $\Delta W = 8\%$ ) was attained when c.d. was 80 amp. and time was 8 hrs. in N with Pt-Pb electrodes.

CC 39 (Textiles)

ST silk rayon electrochem **grafting**; viscose electrochem **grafting**; electrochem **grafting** viscose; **grafting** vinyl acetate viscose; vinyl acetate viscose **grafting**

IT **Polymerization**

(**graft**, of rayon with vinyl acetate by electrochem. process)

IT Rayon, preparation

(vinyl acetate-**grafted**, by electrochem. process)

IT 108-05-4P, Acetic acid vinyl ester, preparation

(polymers with rayon, by electrochem. **grafting**)

L72 ANSWER 12 OF 15 HCA COPYRIGHT 2007 ACS on STN

69:39015 Advances in the electrochemistry of permselective **membranes**. Kertesz, D.; de Korosy, F.; Zeigerson, E. (Negev Inst. Arid Zone Res., Beersheva, Israel). Desalination, 2(2), 161-9 (English) 1967. CODEN: DSLNAH. ISSN: 0011-9164.

AB The influence of counterions on permselective polyethylene phosphonate **membranes** was investigated as a function of their size, hydration, and valence. Deionization of the phosphonate groups causes loss of swelling water and, thus, resistance of the **membranes** increases by >4 orders of magnitude when passing from an alk. to an acid soln. The pH value at which resistance rises most steeply depends on the d. of the phosphonic groups and on the cross-linkage of the **membrane**. An investigation of 4 different anionic **membranes** with isosteric counterions (nitroprusside, ferricyanide, and ferrocyanide) showed that poisoning increases with the charge of the

poisoning counterion. Specific selectivity for one ion against the other was realized in a poly(vinyl chloride) **membrane** aminated with tetraethylenepentamine. This weakly basic **membrane** deionizes in alk. soln. and contracts in length by some 5% compared to its fully ionized acid form. Its **pores** close to the large SO<sub>4</sub>-ion while remaining open to Cl<sup>-</sup> ion. The transference ratio Cl<sup>-</sup>:SO<sub>4</sub>-rises from .apprx.2 to >200 in alk. soln. Bipolar **membranes** were prepd. from a single sheet of poly(ethylene sulfonyl chloride), and their rectifying and transport properties were examd. **Electrolytic** introduction of high valency poisoning ions into the **membrane** causes a transient bipolarity which ceases as soon as the poison reaches the other side of the **membrane**. **Membranes** were filled with their initial counterions in a system of electrodialytic cells under d.c.,; then they were **electrolyzed** free of surplus **electrolyte**. Then, the initial counterions were exchanged for another species of counterions under d.c., and the ions set free were detd. analytically. This method allows detn. of capacities in 24-30 hrs.

CC 66 (Surface Chemistry and Colloids)

ST permselective **membrane**; **membrane** permselective;  
electrochemistry permselective **membrane**

IT **Membranes**

(ethylene polymer and related vinyl polymer, electrochemistry of permselective)

IT Hysteresis

(of elec. cond. of phosphonated ethylene polymer and related vinyl compd. polymer permselective **membranes**, and counterion effect in relation thereto)

IT Electrochemistry

(of **membranes** (permselective))

IT Electric conductivity

(of phosphonated ethylene polymer and related vinyl compd. polymer permselective **membranes**, hysteresis of, and counterions in relation thereto)

IT Hydration, chemical

(of phosphonated ethylene polymer **membranes** and related vinyl compd. polymer **membranes**, elec. **resistance** and **swelling** in relation to)

IT AMF

(elec. cond. and swelling of permselective **membranes** of)

IT 9002-86-2, properties

(aminated, elec. cond. and swelling of permselective **membranes** of)

IT 9002-88-4, properties

(aminosulfonylated, elec. cond. and swelling of permselective **membranes** of)

IT 75-59-2 77-98-5 1310-58-3, properties 1310-65-2 1310-73-2,

properties 1310-82-3 2052-49-5 13408-63-4 14808-79-8,  
Sulfate, properties 16887-00-6, properties 21351-79-1  
(elec. cond. and swelling of phosphonated ethylene polymer and  
related vinyl polymer permselective **membranes** in aq.)

IT 9002-88-4, properties  
(phosphonated, elec. cond. and swelling of permselective  
**membranes** of)

L72 ANSWER 13 OF 15 HCA COPYRIGHT 2007 ACS on STN

61:62222 Original Reference No. 61:10833g-h,10834a Synthesis of  
**copolymers** by **graft copolymerization**  
with 2- methyl-5-vinylpyridine, acrylic acid, and methacrylic acid.  
Kuznetsova, V. A.; Kryazhev, Yu. G.; Rogovin, Z. A.; Toroptseva, T.  
N. Zhurnal Prikladnoi Khimii (Sankt-Peterburg, Russian Federation),  
37(6), 1334-40 (Unavailable) **1964**. CODEN: ZPKHAB. ISSN:  
0044-4618.

AB To obtain materials with a high elec. cond. and good ion-exchange  
properties, films, fibers, and fabrics of polyethylene, poly(vinyl  
chloride), chlorinated poly(vinyl chloride), polymers contg. F, and  
polyamides were modified by **grafting** on them 2-methyl-5-vinylpyridine  
(I), acrylic acid (II), or methacrylic acid (III). Monomer solns.  
that produced swelling of the initial polymers and wetted them  
effectively were used. The following solvents for monomers were  
applied in **graft copolymerizations**: aq. HCONMe<sub>2</sub> or aq. Me<sub>2</sub>CO for III  
on Ftorlon, aq. Me<sub>2</sub>CO for I on Ftorlon; AcOH for I on chlorinated  
poly(vinyl chloride), aq. HCONMe<sub>2</sub> for I or III on polycaprolactam,  
and xylene-BuOH or xylene-HCONMe<sub>2</sub> for III on polyethylene.  
Copolymerization of polyethylene with I did not lead to a  
satisfactory result; its copolymerization with II was less effective  
than with III because of the **lower** degree of **swelling** produced by II  
as compared with III in the solvents used. **Graft copolymerization** of  
I on poly(vinyl chloride) did not require a special solvent because  
poly(vinyl chloride) swelled effectively in aq. solns. of this  
monomer. Copolymerization of poly(vinyl chloride) with II or III was  
not investigated. (BzO)<sub>2</sub> and (NH<sub>4</sub>)<sub>2</sub>S<sub>2</sub>O<sub>8</sub> were used as initiators.  
The materials obtained had an ion-exchange capacity of 1-3.5 meq./g.  
The swollen films had a low resistivity (0.1 10.0 ohm-cm.<sup>2</sup>). A III-  
polyethylene copolymer film showed practically no change in its  
strength or elec. cond. on being kept for 6 months in 40% KOH at 50°.  
Films of this compn. are a satisfactory material for diaphragms used  
in alk. **electrolytes**. The I copolymers could be dyed with acid dyes  
and the III copolymers with basic dyes. Ion-exchange paper was prepd.  
from cotton fibers to which kapron staple fiber copolymerized with I  
or III had been added.

CC 48 (Plastics Technology)

IT Polymerization  
(acrylic acid, methacrylic acid and 5-vinyl-2-picoline

- graft**, on ethylene **polymers**, vinyl chloride polymers, etc.)
- IT Vinyl compound **polymers**  
(chlorinated, **graft polymerization** with acrylic acid, methacrylic acid or 5-vinyl-2-picoline, and ion-exchanging substances thereby)
- IT Cells, **electrolytic**  
(diaphragm for, from ethylene **polymers grafted** with methacrylic acid)
- IT Ion-exchanging substances  
(from **polymerization (graft)** of acrylic acid, methacrylic acid or 5-vinyl-2-picoline, on polymers)
- IT Conductivity, electric and(or) Conduction, electric  
(of **polymers (graft)** contg. acrylic acid, methacrylic acid, etc.)
- IT Nylon  
(**polymerization (graft)** of, with acrylic acid, methacrylic acid or 5-vinyl-2-picoline, ion-exchanging substances from)
- IT Fibers, synthetic  
(**polymerization (graft)** with acrylic acid, methacrylic acid or 5-vinyl-2-picoline)
- IT Dyeing  
(properties, of **polymers**, improvement by **graft polymerization** with methacrylic acid or 5-vinyl-2-picoline)
- IT Ethylene polymers, with acrylic acid, methacrylic acid and 5-vinyl-2-picoline, **graft**  
(and ion-exchanging substances thereby)
- IT Ethylene, chloro-, polymer with acrylic acid, methacrylic acid and 5-vinyl-2-picoline, **graft**  
(ion-exchanging substances from)
- IT 9002-88-4, Ethylene **polymers**  
(chlorinated, **graft polymerization** with acrylic acid, methacrylic acid or 5-vinyl-2-picoline, and ion exchangers thereby)
- IT 9039-02-5, Ftorlon  
(**graft polymerization** with acrylic acid, methacrylic acid or 5-vinyl-2-picoline, and ion-exchanging substances thereby)
- IT 79-10-7, Acrylic acid 140-76-1, 2-Picoline, 5-vinyl-  
(**polymerization (graft)** of, on **polymers**, and ion-exchanging substances thereby)
- IT 79-41-4, Methacrylic acid  
(**polymerization (graft)** of, to ion exchangers)

60:29861 Original Reference No. 60:5226f-h,5227a-c Osmotic interpretation of the swelling of expansive soils. Ruiz, Celestino L. (Highway Dept. Prov., Buenos Aires). National Academy of Sciences-National Research Council, Publication, No. 958, 47-77 (Unavailable) **1962**. CODEN: NASRAE. ISSN: 0547-8464.

AB The total detrimental work which a potentially expansive soil can perform against a superimposed structure during swelling is found by detg. the vol. changes and the swelling pressure (which are functions of the initial moisture content). A theoretical discussion is given of the nature and magnitude of the forces that det. the suction of water into a soil at a certain initial moisture content. It is then shown how those factors may serve as a dependable guide for experimentation. The various mechanisms that det. the absorption of water by soils, starting at an initial moisture content of the order of the shrinkage limit are examd. From a physicochem. standpoint, the osmotic suction is based on osmosis without **membrane** and the Donnan equil.; those fundamental phenomena are discussed and applied to soil swelling and related problems. A Putnam clay soil of known characteristics and compn. (expressed as  $H^+$ ,  $Na^+$ ,  $K^+$ ,  $Mg^{++}$  and  $Ca^{++}$ ) is used for illustrating the application of the theoretical concepts as regards osmotic activity (the max. value of the latter corresponds to a moisture content which is practically identical with the shrinkage limit for the  $Na^+$  and  $K^+$  Putnam clay soils). The relation between osmotic pressure and engineering soil properties is given and it is shown that the clay properties (e.g. plasticity and compressibility) are intimately connected with their cation-exchange capacity, which in turn governs the osmotic suction. The osmotic activity of clay minerals depends on the nature of the exchange cations, among which the  $Na^+$  ion plays an outstanding part. The osmotic interpretation of the consolidation and swelling phenomena occurring in satd. clay soil systems permits the recognition of the following causative factors: (1) the active swelling force is the osmotic pressure of the aq. phase of the soil-water system (this force decreased with an increasing water content); (2) the internal resistance of the soil-water system, which is opposed to this active force, is the sum of the mech. resistance of the system to expansive deformation and of the viscous resistance to the incorporation of swelling water into the **pores** of the system (this sum is a function of the water viscosity and of the permeability of the system); (3) the capacity for swelling and developing a swelling pressure that can perform external work depends on the relative magnitude of the swelling pressure and the internal resistance; (4) remolded, noncemented, expansive soils have a low resistance to deformation and a high one to viscous flow; (5) undisturbed or cemented, structure-endowed expansive soils have a high resistance to deformation and may absorb much water; (6) when the clay fraction of a soil occupies the

spaces between the coarse granular components, the swelling of the clay results in an expansion of the system, if the combined vol. of clay particles and osmotic water exceeds that of the intergranular **pore** space; (7) when the initial soil-water system is not satd. with water, water intake can take place by dislocating the air without increase in the total vol.; (8) the swelling pressure which a soil can develop depends fundamentally on the osmotic activity of the cations in the aq. phase; (9)  $\text{Ca}^{++}$  and  $\text{H}^{+}$  exchange ions in the **swelling** process possess **less** osmotic activity and a greater tendency to aggregation than the  $\text{Na}^{+}$ ,  $\text{K}^{+}$  and  $\text{Mg}^{++}$  ions, which results in an increased internal **resistance** to **swelling** (this explains the **redn.** of volumetric **swelling** by incorporation of portland cement or hydrated lime into a soil). The swelling of subgrades and the influence of free **electrolytes** are also discussed. 27 references.

CC 25 (Mineralogical and Geological Chemistry)

L72 ANSWER 15 OF 15 HCA COPYRIGHT 2007 ACS on STN

56:31763 Original Reference No. 56:6098d-g The influence of the methods of preparation and the hydrogen-ion concentration on the viscosity of guar gum slimes. Bolliger, R. Congr. Sci. Pharm., Volume Date 1959 515-25 (German) **1960**.

AB Guar gum slimes (I) were relatively stable toward heat, acids, alk. solns., and **electrolytes**. I showed a high viscosity and a pH of about 5.5, and were prepd. by dilg. 0.5 g. guar-seedmeal moistened with 4 g. glycerol in 95.5 g.  $\text{H}_2\text{O}$ . I were preserved with 0.0001%  $\text{PhHgNO}_3$  where 0.1% Nipa ester was inefficient. Measurements of viscosity showed a max. after heating I for 30 min. where after 2 hrs. depolymerization occurred. Enzymes in I were destroyed by heating for 30 min. The addn. of alcs. or glycerol to I retarded the max. in the viscosity. Whereas I with 30% glycerol showed a max. of viscosity, 10% EtOH gave a redn. of 60% in the viscosity, and flocculation occurred. EtOH (20%) **prevents** the **swelling** of I. Monohydric alcs. showed a more dehydrating effect than polyhydric alcs. Heated I showed the best stability at pH 6-7 with a max. in the viscosity. At pH 5 and 8, I gave relatively high viscosities, whereas at pH 3 and 10, min. of in the viscosity occurred. At pH 11, an increase in the viscosity of I was measured. I were unstable under alk. and acid conditions. The addn. of buffer solns, to I decreased the viscosity and heat stability. Measurements of the viscosity of I showed pseudoplastic flow curves.

CC 39 (Pharmaceuticals)

IT 1017-56-7, Melamine, tris(hydroxymethyl)-  
(cross-linking of **grafted** cotton by)